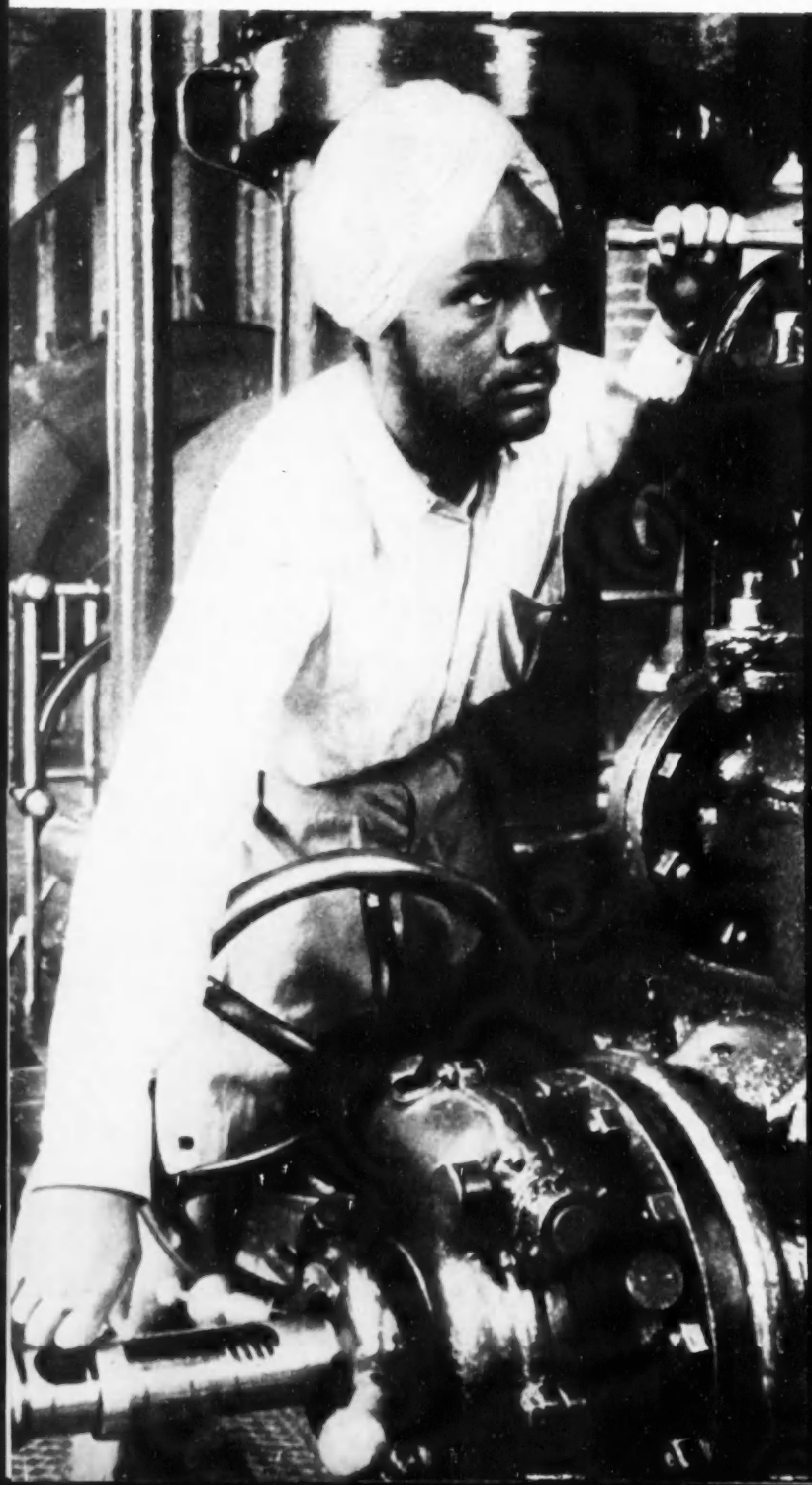
FEBRUARY 15, 1954

NEWS ISSUE

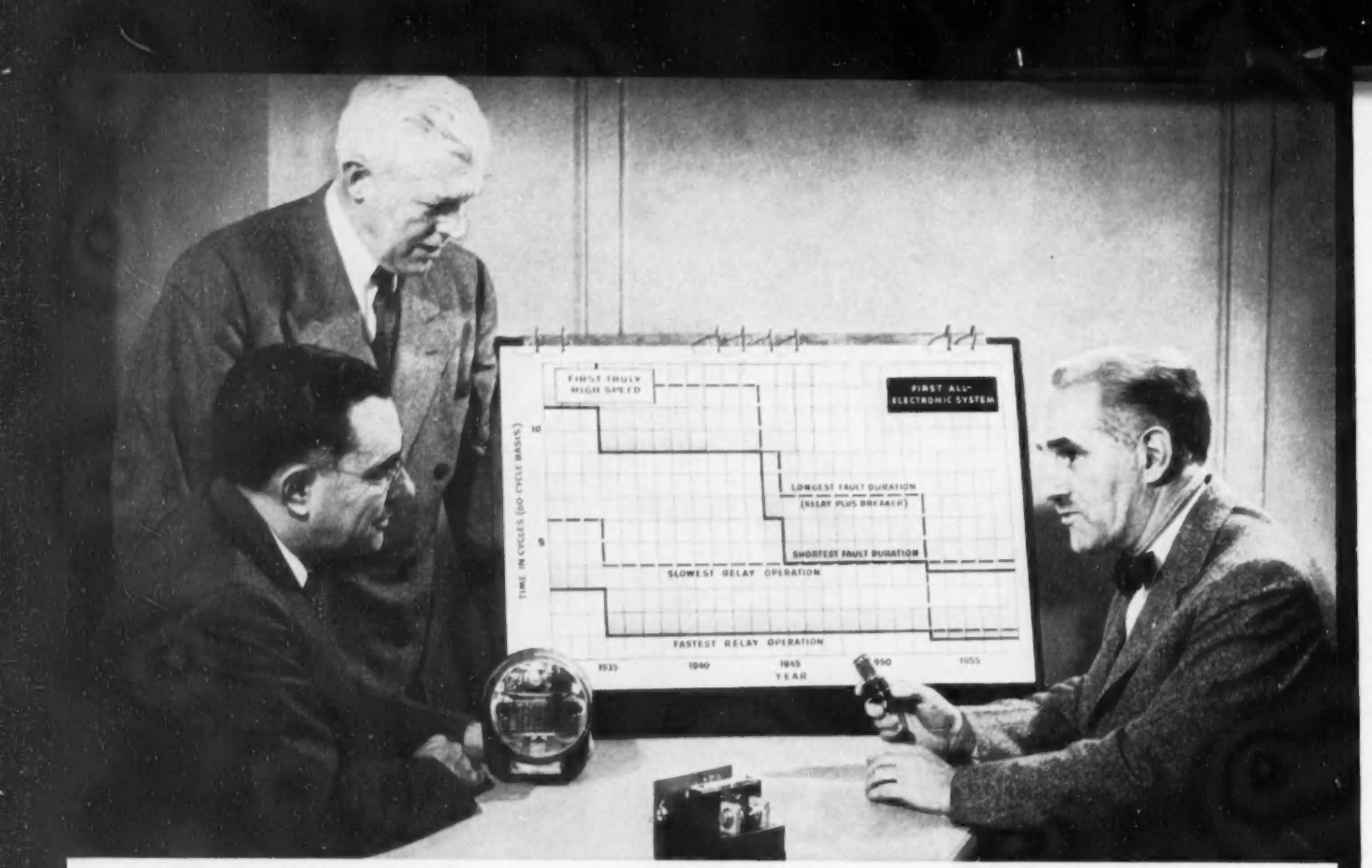
Electrical World

Price 35 Cents

A McGRAW-HILL PUBLICATION



Power-Poor Subcontinent Gets Ready to Turn on More Hydro



FASTER FAULT CLEARING as shown by the chart becomes possible with new relaying system, according to (left to right) W. J. McLaughlin, Manager of Electric Utility Engineering, L. F. Kennedy, Manager of Relay Engineering, and R. E. Cordray, Switchgear Engineering—all of General Electric.

WORLD'S FIRST ALL-ELECTRONIC RELAYING BRINGS INCREASED TRANSMISSION RELIABILITY

New ultra high-speed relay cuts fault-clearing time, improves stability

The world's fastest transmission line protective relay—a revolutionary new electronic system capable of ⅝ cycle operation—will assist electric utilities to reduce fault clearance time, improve system stability, and help solve many of the problems met in higher voltage transmission.

DEVELOPED FOR 330 KV

Developed by General Electric for eventual use at 330 kv, this electronic relaying system was proven in tests by American Gas & Electric Service Corp. on a 132-kv line of Appalachian Electric Power Co. Higher power levels and greater transmission reliability—important factors in overall system operating economy and future load growth—are more satisfactorily handled due to the reduction in fault-clearing time at which this new relay is designed to function (⅝ cycle after a fault occurs) and consequent reduction in outages and fault damage.

This major development in transmission line relay equipment overcomes the mechanical inertia inherent in electromagnetic devices. Its speed of response is independent of both the magnitude or location of the fault, operating with maximum reliability under all load conditions. Germanium rectifiers and tantalytic capacitors reduce the number of tubes required in the fourteen circuits. The equipment can be used on very long lines where fault currents may be considerably less than normal load current.

WRITE FOR FURTHER DETAILS

To assist electric utilities in meeting the problems of higher voltage transmission and circuit loading, General Electric continues to pioneer in even faster relaying systems, higher-speed reclosing circuit breakers, and other protective devices. For further information on electronic relaying write Section 301-253, General Electric Company, Schenectady 5, N. Y.

MORE POWER TO AMERICA

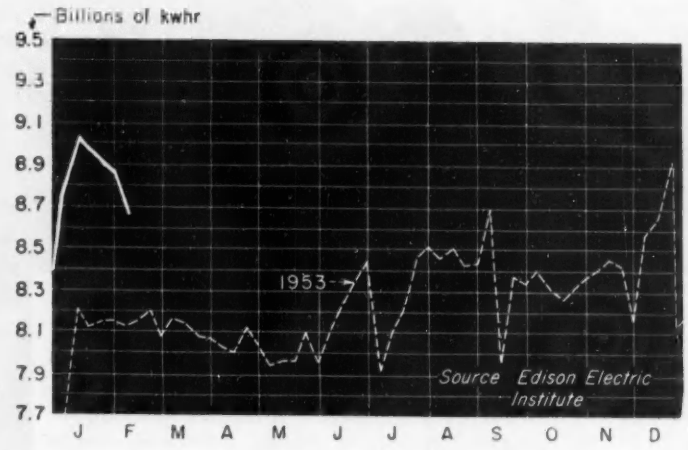
GENERAL ELECTRIC

FIRST ALL-ELECTRONIC RELAYING system, installed at Reusens Station of the Appalachian Electric Power Company on a 132-kv line in Virginia, functions within ⅝ cycle after fault occurs.

VOLUME 141, NO. 7

February 15, 1954

Electrical World



Output Week Ended Feb. 6—8,674,000,000 Kwhr

Seasonally Adjusted Index†—158.6

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Feb. 6	+6.7	+4.7	+3.0	−0.4	+7.0	+19.3	+8.7	+5.3	+13.8	+3.5
Jan. 30	+8.6	+5.9	+3.5	+1.5	+11.5	+18.7	+10.7	+9.3	+21.6	+8.3
Jan. 23	+10.2	+6.5	+5.5	+2.5	+11.9	+21.3	+8.1	+9.6	+30.6	+9.4

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load (Million Kw)	Dec.	81.2**	78.1	75.5**
Capacity (Million Kw)	Dec.	91.49	89.81	82.05
Production (Billion Kwhr)	Nov.	36.38	37.61	33.78
Hydro	Nov.	6.91	7.14	6.52
Fuel	Nov.	29.47	30.48	27.25
Fuel Consumption				
Coal (Million Tons)	Nov.	10.17	10.22	9.95
Oil (Million Barrels)	Nov.	6.91	6.78	7.77
Gas (Billion Cu Ft)	Nov.	81.13	96.85	69.17
Sales (Billion Kwhr)	Nov.	31.59	32.21	30.08
Residential	Nov.	9.02	8.70	8.16
Commercial	Nov.	5.50	5.62	5.01
Industrial	Nov.	14.95	15.56	14.91
Other	Nov.	2.12	2.33	2.01
Net Income Class A & B Companies ($ Million)	Nov.	84.99*	76.19	80.63
Estimated Dec. '54 Peak (Million Kw)	Nov.	94.7	94.8	96.1
Kwhr per Residential Customer (12 Month Average)	Nov.	2,331	2,318	2,155
Revenue per Kwhr Residential Service (12 Month Average)	Nov.	2.75¢	2.75¢	2.77¢
Canadian Production (Billion Kwhr)	Nov.	5.45	5.51	5.22

Business Statistics

FRB Industrial Production Index†	Dec.	125*	130	131
Gross National Product Annual Rate ($ Billion)	3rd Qtr.	369.0	372.4	345.3
EW 4 Industry Production Index†	Dec.	120.4	121.8	125.9
ENR Construction Cost Index††	Jan.	128.7	128.2	123.1
BLS Consumer's Price Index	Dec.	114.9	115.0	114.1
NEMA Insulation Materials Sales Index†	Nov.	130	154	155
NEMA Electric Appliance Sales Index†	Nov.	70	91	100
NEMA Household Refrig. Sales Index†	Nov.	35	46	77

*Preliminary **Revised †1947-49=100 ††1949=100

THIS WEEK

The Electrical Week 5
In the Industry 10
Technical Notes 10
News About People 37
Industrial Relations 52
Sales and Service 54
Manufacturers and Markets 59
Regulations 62
Financial 63
Electrical Business Outlook 66

RALPH H FLYNN, Publisher
FISCHER BLACK, Editor
DANIEL T BRAYMER, Managing Editor
A E KNOWLTON.....Senior Associate Editor
FRANK R INNES.....Associate Editor
LEONARD M OLMSTED.....Associate Editor
ROBERT C BLATT.....Associate Editor
KENNETH K. KOST.....Associate Editor
HERBERT FRANKEL.....Associate Editor
JOHN F WICKLEIN.....Associate Editor
EDWARD ALLEN.....Midwestern Editor
HOWARD KNOWLTON.New England Editor
RUE M SHOOP.....Middle Eastern Editor
FRANCIS KOVALCIK.....Western Editor
JOSEPH MICHALAK.....Assistant Editor
DAVID REA.....Assistant Editor
JEANNE BERNHARDT.....News Editor
IRIS ST. CLAIR.....Departmental Editor
ARY MOSSIMAN.Manager of Market Research
ANN L ADAMS.....Production Editor
W J WALLACE, JR.....Assistant Art Director
G B BRYANT, JR.....Mgr. Washington Bureau
JESSE MOCK.....Washington Correspondent
DEXTER M KEEZER.....Dir. Economics Dept
ROBERT P ULIN, RICHARD W EVERETT
Economics Department
WORLD NEWS BUREAU, Joseph K Van Denberg, Jr., Editor, London, Paris, Frankfurt, Tokyo, Sao Paulo, Mexico City, Manila.
DOMESTIC NEWS SERVICE, Atlanta, Chicago, Cleveland, Detroit, San Francisco, Houston. Correspondence in 43 cities.
ADVERTISING STAFF, District Managers E F Coffey, New York; N V Palmer, Boston; F P Coyle, Philadelphia; M S Kearney, Cleveland; F S Chapin, Detroit; W H Meneilley, Chicago; J. T. Schaefer, St. Louis.

Electrical World
Vol. 141, No. 7
February 15, 1954

Published weekly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. Publication Office, 99-129 N. Broadway, Albany 1, N. Y. Executive, Editorial and Advertising Office: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Donald C. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publication Division; Ralph B. Smith, Vice-President and Editorial Director; Nelson Bond, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Director of Circulation.

Subscriptions: Address correspondence to Electrical World—Subscription Service, 99-129 North Broadway, Albany 1, N. Y., or 330 W. 42nd St., New York 36, N. Y. Allow one month for change of address.

Subscriptions are accepted only from executive, supervisory, and engineering personnel in electric utilities, manufacturing companies, and related fields. Position and company connection must be indicated on subscription orders.

Single copies 25¢. For the United States and possessions $6 a year, $9 for two years, $12 for three years. Canada, $7 for one year, $11 for two years, $14 for three years. (Canadian money, at par.) Other Western Hemisphere, $15 for one year, $25 for two years, $30 for three years. All other countries $25 for one year, $40 for two years, $50 for three years. Entered as second-class matter, November 16, 1936, at the Post Office at Albany, N. Y., under the Act of March 3, 1879. Printed in USA. Copyright 1954, by McGraw-Hill Publishing Company, Inc. Permission required to reproduce any of contents.

reduce premium on clearance

Space deadends as close as you wish and always have room left over for easy conductor clamping when you use O-B Strateline Clamps! Acknowledging that phase clearances are frequently close in distribution construction, O-B designers produced a clamp of more than adequate holding strength in an extremely narrow shape. Thus there is always room to work the clamp easily and safely; tape is readily applied if needed; and insulating sleeves for hot line work attach in a simple manner.

Cast in aluminum, bronze, or malleable iron, Strateline Clamps match the conductor; thus avoid electrolytic corrosion and weakening of the clamp purchase after prolonged use. With increasing use of aluminum feeder, this clamp finds special popularity as it accommodates diameters as great as 1.55 inches.

Thus wherever clearance is a factor in construction planning, you can choose O-B Stratelines with the assurance of ample work space, and of complete adaptability to your construction method. See the complete Strateline group on page 70 of your O-B No. 28 catalog!

Ohio Brass

MANSFIELD OHIO, U.S.A.

IN CANADA, CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

4433-H

THE ELECTRICAL WEEK

The Issue's News Highlights—Appropriations for TVA and designation of an entity to develop additional power at Niagara are up for debate on Capitol Hill.

Consolidated Gas of Baltimore wins suit against Pennsylvania Water & Power . . . REA gives Arkansas G&T co-op more time in which to come up with plan for use of $10.5 million in loan funds . . . Hoover task force on power is directed to conduct open hearings.

Atomics continue to make news. Newest wrinkle is an atomic railroad locomotive that would run for a year on 11 lb of uranium and develop four times the power of a diesel engine. Its designers: a group of nuclear physicists at University of Utah, working with five railroads and nine manufacturers. According to Dr Lyle B. Borst, project director, the 7,000-hp, 160-ft rail giant would have the "fast pickup" of electric locomotives. He said it could compete with diesels, if uranium cost less than $11,000 a pound. He added figures show uranium costs about $2,000 a pound less than that.

Among companies in the project is Babcock & Wilcox, which is seeking a patent along with University of Utah. Others include Commonwealth Edison, GE, and Westinghouse.

Creation of an Idaho state commission with authority to acquire and operate electric facilities is aim of Idaho Citizens Legislative Committee, Inc, now circulating petitions to have the issue come up for vote in November. Starting with an appropriation of $200,000, it is proposed that the commission sell revenue bonds to finance activities.

Pacific G&E filed application with FPC for construction of $89 million worth of hydro facilities in a McCloud-Pit River development near Redding, Calif. Plans call for eight dams and two powerhouses, which will develop 232,000 kw of generating capacity.

Volunteer Electric Cooperative, Decatur, Tenn., charged TVA is creating "unwholesome apprehension" among co-ops in its service area by proposing to sell power direct to Bowaters Southern Paper Corp. Volunteer filed an amended complaint in federal court, stating move violates TVA-co-op agreement.

BPA's Harry M. Kenin, executive secretary to administrator since 1942, resigned last week. In companion move, nine BPA marketing and customer service posts were eliminated by Interior.

Siemens [**Germany**] submitted the first project report for establishment of a heavy electrical equipment factory. The project involves a capital outlay of about $84 million and is planned to meet almost all India's requirements in this sphere.

Off the Washington Wire—At least five electric companies filed single or joint proposals for participating in development or construction of first utility-size atomic power plant under direction of AEC. Today [Feb. 15] is the deadline for submitting other proposals for partnership with AEC.

AEC recently announced that General Electric is one of the eight industry teams studying the economic future of industrial nuclear power. GE study will include not only production of power but also related products and byproducts of power reactors.

Pres Eisenhower's idea of local-federal partnership for developing hydro is catching on in Congress. Legislation is in mill to permit local interests to build power features and government to pay for other features of three waterway projects. Projects are: Markham Ferry, Oklahoma, Priest Rapids, Washington, and Cougar, Oregon.

House passed and sent to Senate a bill requiring Congressional authorization of all but smallest Reclamation projects. Under present law, Secretary of Interior has power to authorize such projects and go to Congress for appropriations.

Interior Solicitor Clarence A. Davis ruled that 200,000-kw Yellowtail hydro project in southeastern Montana is fully authorized under existing legislation, and all that is needed is appropriation by Congress. Previous departmental opinion held that a 1946 act prohibited construction because some of reservoir area would lie within Crow Indian reservation.

Connecticut Development Credit Corp, spearheaded by Connecticut L&P, announced its first meeting of stockholders and members for Feb. 23 in Berlin. Corporation, owned by individuals and companies, will provide Connecticut industries with long-term credit and equity capital previously unavailable through regular credit channels.

West Penn Power received Pennsylvania PUC approval to buy Natrona L&P for $508,000.

Detroit Edison filed two bills in Michigan legislature to give it right to buy about 88 acres of submerged land at Harbor Beach. It would lead to building a power plant to cost maximum of $100 million.

Executive Changes—O. Titus, president of Metropolitan Edison and Pennsylvania Electric, announced T. O. McQuiston, vice president and general sales manager, for Meted, will also serve Penelec as system residential and commercial sales manager. W. C. Sontum, engineering vice president of Penelec, becomes engineering coordinator of the two utilities, and P. R. Lawson, Penelec's comptroller, also takes on duties of accounting coordinator of Meted.

Congress Takes Up Power Issues

TVA Still a Storm Center

Fight over continued power expansion for Tennessee Valley Authority is gaining momentum.

President Eisenhower's budget drew the line against any new starts on power generating units for the fiscal year beginning next July. As an alternative, he offered to shift a sizable hunk (600,000 kw) of TVA power commitments from Atomic Energy Commission plants to other TVA customers.

TVA power experts, with plenty of backing from valley power users, favor a big new steam generating plant north of Memphis, to serve increasing loads. The proposed Fulton Plant would have an installed capacity of 450,000 kw.

New Developments . . . There were these new developments in Washington last week:

- A House Appropriations subcommittee heard TVA officials plead for the full $120.9 million recommended in the Eisenhower budget for continued work on TVA projects already under way. There was also a hint that funds would be asked for the Fulton Plant if it were found that the AEC load could not be diverted to other utilities.
- TVA power users and area politicians asked the House subcommittee to provide funds beyond the budget request for power expansion.
- Sharp debate broke out on the Senate floor with TVA area senators charging that Republicans in high places are out to wreck TVA, and Senate Republican leaders answering that this is not Administration policy.
- Harry C. Carbaugh, Chattanooga businessman, was gaining important Republican support to replace TVA Chairman Gordon R. Clapp when his term expires in May.

Clapp Makes Plea . . . At a closed session of the House Appropriations subcommittee on TVA funds, Clapp led a host of TVA officials in the annual plea for funds for continuing power expansion. Although the TVA men were generally restricted to the President's budget requests, they let it be known that they still haven't given up hopes on building the Fulton Plant.

A Republican member of the subcommittee flatly predicted that TVA would be lucky to get the $120.9 million requested by the President. He said there was almost no chance money would be provided to start construction of the Fulton Plant.

Public officials and power users from the area led by Tennessee Gov Frank C. Clement were slated to make an all-out effort to get funds for the Fulton Plant. In statements prepared for a subcommittee hearing, these TVA backers attempted to picture the Fulton Plant as the key to all future TVA power expansion.

Attack on Budget . . . In the Senate, Mississippi Democrat James O. Eastland led a spirited attack on the President's budget requests for TVA. After noting that several prominent Republicans had called for sale of TVA assets, he conceded that it may not be Administration policy to liquidate the authority. "But what we must fight now," continued Eastland, "is the starvation diet which has been set for it and the war of slow attrition which stalks behind this camouflaged propaganda."

The attack was countered by Republican Floor Leader William F. Knowland, who has long been friendly to TVA.

"I feel certain in my own mind that there is no policy in the Administration either to sell or liquidate the TVA. I can say on my own responsibility that I would most vigorously oppose such a policy," Knowland said.

Backing for Carbaugh . . . Important backing in the Republican party is building up for Harry C. Carbaugh, president of Tennessee Egg Co, to replace Clapp as TVA head. Carbaugh, who claims no utility experience, is a member of the National Republican Finance Committee and a GOP state leader.

Asked if he had any definite views on TVA operations, Carbaugh told Electrical World: "If I have, I haven't expressed them."

Some valley leaders in the TVA fight fear that if Carbaugh is appointed he will not fight for continual TVA power expansion. And senators from the TVA area are looking into Carbaugh's qualifications and political connections as grounds for opposing his confirmation. The question has been raised as to whether his work for the Republican National Committee would disqualify him.

Niagara Hearing to Resume

Public versus private power will have its first real test of the session before a Senate committee this week. The $380-million Niagara power development project is due for a full-scale airing before the Senate Public Works Committee. Four bills are before the committee, which pose a choice between public and private development of additional power facilities on the Niagara River between New York State and Canada.

Three of the bills would result in construction of the 1.1 million-kw installation by the New York State Power Authority, while the fourth bill would provide for construction by five New York private power companies.

The Bills . . . These bills will be debated by the committee:

Miller-Capehart bill would call for construction of the power project by private utilities and give preference to defense facilities in sale of power.

Ives-Becker bill, introduced on behalf of Gov Thomas E. Dewey, would authorize the Federal Power Commission to license New York State Power Authority to build the U. S. portion of the power project.

Case bill would turn the matter over to FPC with no strings attached. When the Senate ratified the 1950 treaty with Canada authorizing use of additional water from Niagara for power purposes, it attached a condition that Congress could name the entity to develop the U. S. half of the power. The Case bill, in effect, would eliminate this condition. Since the Federal Power Act gives states preference over private companies for developing hydro sites, other factors being equal, it is expected FPC would

issue the license for Niagara development to New York Power Authority.

Lehman-Roosevelt bill would provide for a state body, presumably New York Power Authority, to build the facilities. But in contrast to other public power bills, this bill would provide for preference to municipal and public agencies in sale of power.

The Lehman-Roosevelt bill originally provided for federal construction of the project, but now is being rewritten to provide for state construction. Sen Herbert H. Lehman said he would introduce the amended bill this week. Sen Edward Martin, chairman of Senate Public Works Committee, announced hearings would begin as soon as the Lehman-Roosevelt bill had been introduced, likely later in the week.

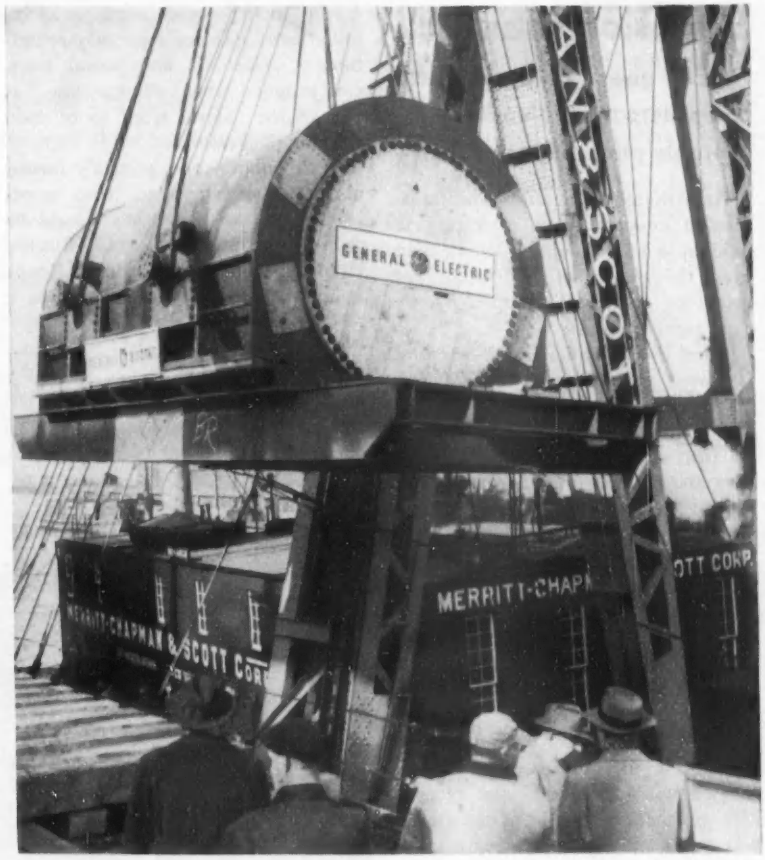
Dewey Intervention . . . The Miller bill passed the House last session by a two-to-one margin and its companion bill, the Capehart bill with Chairman Martin as a co-sponsor, appeared headed for committee approval last summer. At that point Governor Dewey was granted a hearing before the committee and his dramatic appearance is credited with forestalling Senate action on the bill last session.

Governor Dewey privately told Republican members that passage of the Miller-Capehart bill would hurt the GOP's chances in the gubernatorial race next fall in New York. Also, the passage of the private bill would provide an issue for Franklin D. Roosevelt, Jr, who is almost sure to be the Democrats' choice to run for governor of New York.

However, the odds appear to be in favor of the Miller-Capehart bill and it is likely to be approved after two or three days of hearings. But when the bill reaches the Senate floor, it is expected to provoke extended debate with liberal Democrats going all-out against private power leanings of the Republican Administration.

Chapman Heads Survey

Oscar L. Chapman, former Secretary of the Interior, plans to conduct a survey for Pennsylvania Coal & Coke Corp to determine areas where the firm can participate in the development of atomic energy for peacetime use. Chapman is a director of the corporation.



U.S. Stator Heads for South America

Largest stator ever exported from the United States to South America was loaded early this month aboard a cargo ship bound for Rio de Janeiro. The 130-ton piece of equipment will be installed in a power plant being built at Sao Paulo, Brazil, under the supervision of Stone & Webster Engineering Corp. The stator is part of a 100,000-kw generating unit manufactured by General Electric Co for the new plant. The $32-million plant will have a second unit of similar size and when completed will be the largest steam power plant in Brazil.

Consolidated Gas Wins Suit Against Penn W&P

A $1,085,762 judgment has been won by Consolidated Gas Electric Light & Power Co of Baltimore against Pennsylvania Water & Power Co. This judgment ends a suit which has been in litigation in courts and before Federal Power Commission for several years.

The judgment also granted Consolidated interest at 6% from Sept. 1, 1952, plus payment of costs by the Penn W&P.

The dispute started with a 1949 agreement between Penn W&P and the Maryland utility whereby Consolidated was to continue payments to Penn W&P at a former amount pending final court decision on a FPC reduction in rates charged the gas and electric company by the Pennsylvania W&P.

Consolidated, however, was to collect accumulated overpayments to Penn W&P if new rates were sustained. Rate action of FPC was upheld in June, 1952, but the two companies were unable to agree about fulfillment of the 1949 agreement with retroactive clauses covering overpayment to Penn W&P. As a result Penn Water brought a $17-million antitrust suit against Consolidated, which in turn filed suit for the $1,085,762 overpayment that was awarded to the Maryland utility.

Extension Granted

REA gives Arkansas G&T co-op more time to work out acceptable plan for use of loan

An Arkansas generating and transmission cooperative is managing to hold on to a $10.5-million federal loan even though its original plans for using the loan were quashed by the state supreme court.

Rural Electrification Administration last week granted a second extension of time to permit Arkansas Electric Cooperative of Ozark, Ark., to come up with an alternate and acceptable plan for building a steam plant and related transmission facilities.

Arkansas Supreme Court, in a widely publicized decision early last year, held that the co-op did not have authority to build the facilities for integration into the Southwestern Power Administration system. The co-op had already obtained approval of the loan from REA.

Following the court decision, REA announced the loan would be rescinded unless a revised and acceptable application for use of the funds was presented. In September of last year, co-op representatives asked for time to develop new plans and engineering studies. A four-month extension was granted, expiring Jan. 15.

By that date, the co-op presented plans for locating the plant at Sallisaw, Okla., near the Arkansas border. In this way it was thought that the Arkansas court decision would not interfere. Proposed plant would have a capacity of 33,000 kw.

Line Relocation Grants Sought on Road Projects

Telephone and electric utilities were stepping up their efforts last week to get the federal government to pick up a part of the tab for relocating lines on federal-aid highway projects.

The federal highway bill in the House provides for a study of problems involved in the removal and relocation of utility lines along highway rights-of-way. This would be a step toward the objective sought mainly by the telephone companies, but far short of their goal.

The utilities are asking that a portion of the federal grants for highway construction be made available to reimburse utilities for necessary relocation of telephone and power lines. One proposal would allow as much as 5% of the federal grant to be used for this purpose.

Both publicly and privately owned utilities have supported these provisions with the hope they would be written into the highway bill. But the House Subcommittee on Public Roads indicated early last week it wanted a lot more data on possible costs and legal problems before incorporating any such proposal into a highway measure.

Proposals involving reimbursement for relocation of utility lines concern only those lines located on publicly owned rights-of-way. Nearly all states already provide for payment of damages incurred when privately owned rights-of-way are condemned for highway use.

Logs Tunnel Through Albeni Falls Dam

Albeni Falls Dam on Pend Oreille River near Newport, Wash., is no barrier to logs in their passage downstream to sawmills. The dam is equipped with a tunnel through which the logs can pass and is believed to be the first installation with such a provision.

In picture above, boommen guide logs into the 50 ft tunnel on the upstream side of the dam. A reinforced concrete trough 400 ft long, 6 ft wide, and 10 ft deep carries the logs from the tunnel to quiet waters below the dam. The intake tunnel and chute control gates govern elevation and velocity of water passing through and adjust the operation for varying river conditions. Chute control gate is operated by gantry crane at upper left.

Competition for Contracts Keen

Interior gives autotransformer order to American electrical company for one project and to foreign firm for another

Interior Department went down the middle in awarding two recent contracts for large autotransformers—giving one to a U. S. firm and the other to a foreign firm.

Bids received on the two purchase contracts indicate the increasingly tough competition between foreign and domestic manufacturers of heavy electrical equipment (see table). In both cases, foreign firms underbid domestic manufacturers by substantial margins. They maintained the edge even after the bids were evaluated. Contract won by the U. S. firm was made on the basis of experience requirements.

BPA Contract

Firm	Price Bid	Evaluated Bid
American Elin Corp. (of Austria)	$268,050	$319,766.67
Industrie Elettriche Di Legnano (of Italy)	337,216	412,490
Moloney Electric Co	403,650	469,680
Ferranti Electric Ltd. (of Great Britain)	426,800	522,850
English Electric Co. (of Great Britain)	430,125	526,474.22

Bureau of Reclamation Contract

Firm	Price Bid	Evaluated Bid
American Elin Corp.	$219,750	$531,099.50
Industrie Elettriche Di Legnano	245,856	537,114.65
English Electric Co.	318,825	678,300.75
Pennsylvania Transformer Co	358,263	713,567.61
Allis-Chalmers Manufacturing Co	377,625	723,658.71
General Electric Co.	381,366	781,384.17
Westinghouse Electric Corp	397,542	724,602.02

Stresses 25% Differential . . . In both cases, Interior stressed that its "Buy American" regulations require a 25% differential to be added to foreign bids in comparing them with bids offered by U. S. firms. However, this differential is largely cancelled out by the evaluation made of escalation clauses in U. S. bids, which add approximately 20% to the base bid. Foreign firms usually offer a fixed-price bid.

Larger of the two contracts went to Moloney Electric Co of St. Louis, Mo., for an autotransformer bank to be installed at Bonneville Power Administration's Glen H. Bell substation near Spokane. This bank will have a stepdown range from 230 to 13.8 kv and a capacity of 75,000 kva. Specifications call for a reduced insulation level of the most advanced design. Moloney's price bid was $403,650.

Moloney had had considerable experience in manufacture of this type transformer in the higher voltage range. One bank built by the St. Louis firm is already in operation at the Bell substation.

Low bidder, American Elin of Austria is building a bank of this type to be delivered to BPA in July of this year. But up to the time the most recent contract was awarded, the foreign firm lacked the experience in construction, testing, and operation of this type transformer required by the contract specifications.

If the transformers to be delivered in July measure up to specifications, American Elin will then be in a position to meet the experience requirements of the more recent contracts.

Smaller of the two contracts went to American Elin for an autotransformer with a stepdown range of 230 to 13.2 kv and a capacity of 60,000 kva for Bureau of Reclamation's Jamestown (N. D.) substation. The Austrian firm's bid was $219,750.

In evaluating the bids, the contracting agencies adjust the price bid for guaranteed efficiency, maximum price increases where stipulated by the bidders, and a differential of 25% of the cost of foreign manufactured equipment. In the case of the Reclamation contract, adjustment was also made for bids on supplying spare parts.

Open Hearings Ordered for Hoover Power Unit

Hoover Commission on Government Reorganization voted last week to direct its Task Force on Water and Power Resources to conduct open hearings in the course of its investigation of federal power activities.

This move was considered a partial victory for public power groups which have asked for more representation on the task force and for open hearings.

Rep Chet Holifield (D-Calif.), and member of the Hoover Commission, had urged that the task force be expanded to include three members with public power viewpoints. He interpreted the open hearing order as a compromise on his own motion to expand the task force. It came before the commission in the form of a substitute for the Holifield motion.

Public power groups such as the American Public Power Association have charged that the task force is loaded with anti-public power members (EW, Nov. 23, '53, p 7). Recent convention of the National Rural Electric Cooperative Association voted to recommend more representation of public power and co-op groups on the Hoover task force.

As of last week, no hearing schedule had been announced by the task force.

POWER BRIEFS

- Georgia Power Co has assigned an engineering team to survey a 1,100 acre site on Hobbs Island 15 miles from Huntsville, Ala., for possible construction of a steam plant. The utility, which recently acquired an option for the tract, said Huntsville was one of a number of sites under consideration for the plant.
- Chelan County PUD has completed filing plans with the State of Washington for a 145,000-kw power and flood control project on the Wenatchee and Chiwawa Rivers. An application for a license has been sent to Federal Power Commission.
- Tennessee Valley Authority has started spilling water at all of its main river dams and at two of its major tributary structures since recent rains raised levels of all tributary reservoirs. Prior to the rains, some tributary reservoir levels had reached record lows.
- Federal Power Commission has denied Northwest Public Power Association's petition for a hearing of its plea to have the commission's allocation of McNary dam costs to power reduced to 50%, as at Bonneville Dam. The association filed its petition after FPC ruled that 97.5% of joint costs at McNary should be charged to power.
- Cleveland Electric Illuminating Co expects to start construction this month on a 208,000-kw addition to its Eastlake Plant.

IN THE INDUSTRY

The Atomic Battery: Round 2

Announcement by Radio Corp of America that it had developed an atomic battery which converts small quantities of nuclear energy directly into electrical energy has caused a two-way controversy. First critical reaction came from leaders in the power industry and the atomic energy field, who felt RCA had painted the future of its product as a power source with far too brash strokes. Then, last week, another development broke that is sure to raise a hackle or two:

Ohmart Corp of Cincinnati, Ohio, asserted it had marketed a battery that did precisely the same thing in August 1951. The term, "atomic battery", the firm pointed out. had been applied to its nuclear cell in releases to the business press in October of that year.

Who dunit First? . . . Phillip E. Ohmart, president of the corporation, said he had proposed work leading to the cell's development while he was working for Atomic Energy Commission at AEC's Mound Laboratory in July 1950. That year, Ohmart left government service to form his own firm to produce the cells for use in industry. Since 1951, he said, the corporation has been developing miniaturized versions of battery to produce a source of constant current and constant voltage.

Wright Air Development Center of the Air Force's Air Research and Development Command became interested in direct conversion of radioactive energy into electrical energy in April of '51. The Center asked Ohmart to demonstrate the principle of his instrument, and on June 13, 1952, signed a contract for the corporation to develop a nuclear cell for use as a standard reference and current source. First cells were delivered to the Air Force last July, for use in electronic equipment having circuits which require such a source. At present, Ohmart Corp is working to improve the characteristics of nuclear cells for Air Force use.

(In its announcement, RCA said it had been given encouragement and support from the Air Force on the battery in 1951.)

Whatever future results may be, Ohmart said, published predictions that refrigerators, washers and home heating plants would operate on "thumb-nail" size batteries are "certainly not for the immediate future."

That's just the position an RCA spokesman took when asked about that company's development of its battery (EW, Feb. 8, p 70). Although the original RCA announcement envisioned a day when atomic batteries in the home would eliminate the need for utility distribution systems, the spokesman commented this was a long-range dream indeed. "We consider it mainly as a low-power source for things such as transistors," he said.

Other Interested Parties . . . Which brings us up to others interested in the battery. "Studies have been made on the use of atomic radiation instead of light which is the basis for the atomic battery," General Electric Co's director of research, Dr C. G. Suits, told Electrical World. He said that these studies were conducted at the Knolls Atomic Power Laboratory and at GE's Research Laboratory extending over more than two years.

Said Suits: "Any of the several types of by-product radiation, as well as fission fragments, may be employed for this purpose, but the efficiency of the conversion with any kind of radiation has thus far been very low."

With presently known barrier cells and strontium 90 at the AEC price ($500/curie) the cost of a kwhr produced by this method is $142,000. At the price for strontium in large volume production, estimated by RCA to be $2/curie, the kwhr would cost $570. This is merely the cost of the required radiation, Dr Suits pointed out, but the cost of the cells would be a substantial addition to these cost estimates.

Even if the efficiency were greatly improved, the cost of the by-product radiation, because it must either be recovered by expensive radiochemical separation and/or handled by shielded techniques, is very high.

There are indications that the furor over RCA's announcement is not yet over. At least two other concerns are known to be working on the development and on the whole field of direct conversion of atomic to electrical energy. But how this will affect the power industry 10, 50 or 100 years from now you'd have to be clairvoyant to say.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Plug-in relays and switches with dust-proof covers readily removable for inspection and adjustment are helpful adjuncts of control equipments.

Elastic limit for hard drawn aluminum at room temperature is at 10,000 psi; for three-quarter hard it is virtually the same but for soft-drawn it is about 1,600 psi.

Copper to aluminum connections at station apparatus busbars call for a more practicable method of excluding moisture than just taping.

Boiler television reveals incipient conditions tending toward internal explosion or combustion inefficiency long before either would be caught by periodic inspection.

Cost of maintaining an operably clean boiler has been reduced from 7.3 cents per barrel of fuel oil without additives to 0.78 cents when adding dolomite in amounts about equal to the ash content.

Flyash substituted for 30% of the cement increases the strength nearly 10% after 15 days curing. The mix sets more slowly and develops strength more slowly.

Twenty tons of natural uranium would be required annually for a 150 Mw plant operating at 25% thermal efficiency, 80% plant factor and 1% burn up in regenerative (plutonium) operation.

Ten kv insulation has been provided between wires and to ground on terminal 2,500 feet of Bell Telephone pilot and supervisory cable. Objective is safety to telephone personnel, but it also contributes cable protection against ground faults at substations.

Average daily rainfall across the U. S. is 4,300 billion gallons a day. Two-thirds disappears by evaporation or transpiration leaving 1,400 billion gallons to flow down the rivers.

IMPORTANT NEWS FOR USERS OF G&W TYPE "RA" LOAD BREAK OIL SWITCHES

Installation and maintenance instructions now available in a single bulletin!

You'll call G&W's new Bulletin DD53 the handiest book in your reference file. This 12-page bulletin contains complete information on the construction details of the various forms of Type "RA" oil switches. It explains why you are getting so many years of trouble-free service with your "RA" oil switches. It shows why you can use them with confidence for load break sectionalizing in your underground and overhead distribution system.

Bulletin DD53 provides in a single source all the information you need to assure proper installation, trouble-free performance and long life for your Type "RA" switches. Send for your copy of this comprehensive service bulletin today.

Send for your copy of New Bulletin on "RA" Oil Switches

D541

G & W Electric Specialty Co.
7780 Dante Ave., Chicago 19, Ill. Date_____

Please send me a copy of new Bulletin DD53—Type "RA" OIL SWITCHES—
Send _____ extra copies for other men here.

Name_____ Title_____

Company_____

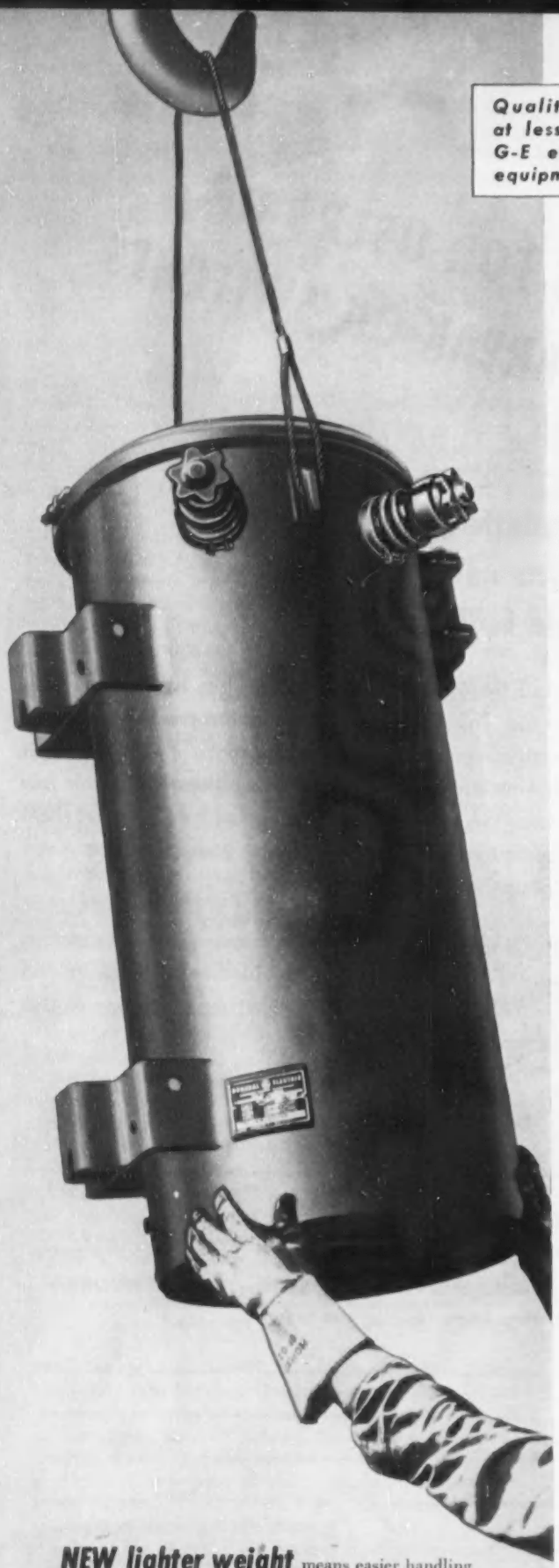
Number, Street or P.O. Box_____

City_____ Zone_____ State_____

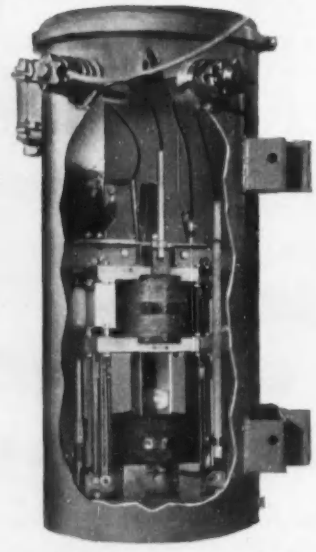
Quality lighting at less cost with G-E engineered equipment.

ALL NEW G-E Constant-current TRANSFORMER for Street-lighting Systems

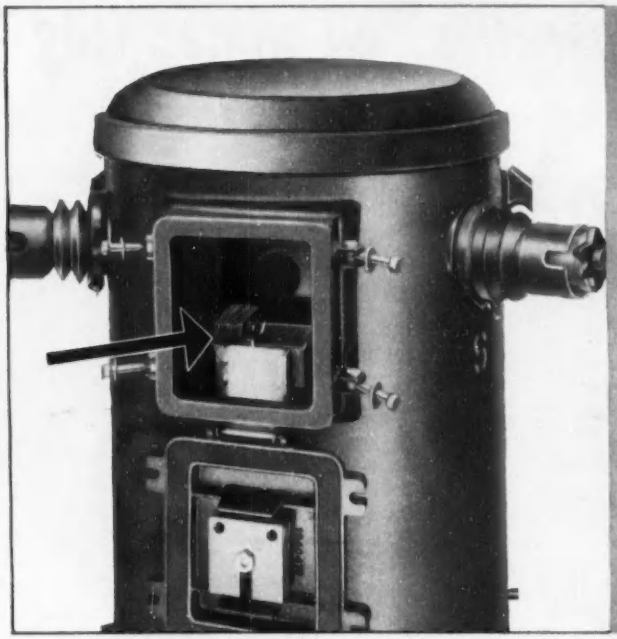
up to 33% lighter



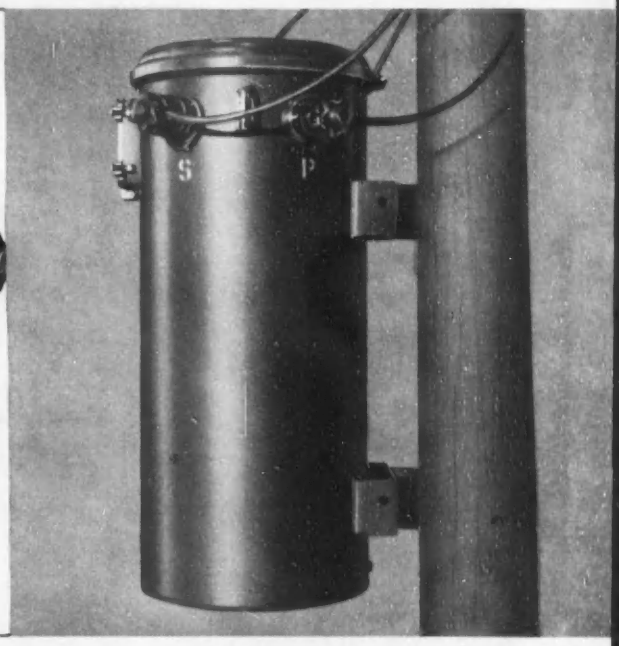
NEW lighter weight means easier handling. RO2 transformer, including oil, is 20% and 33% lighter in the 10-kw and 30-kw sizes respectively.



NEW faster response to load changes from radically new design which eliminates counter balance, introduces parallel straight-line motion, cuts down friction points.

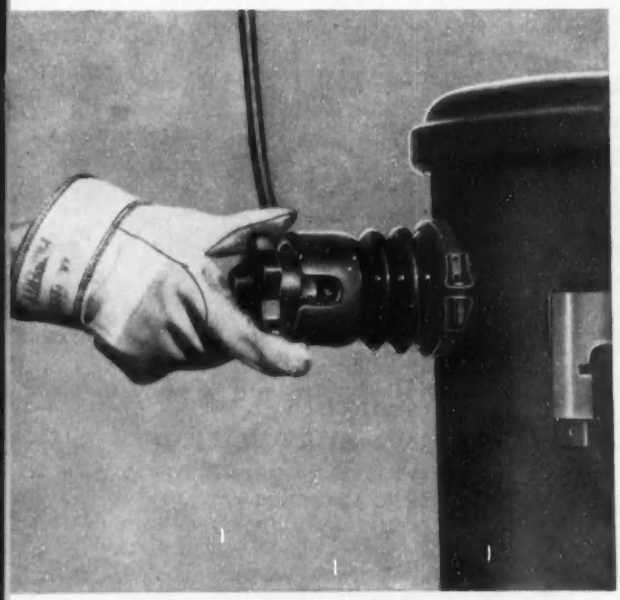


NEW easy adjustment is accomplished from the outside through convenient access door located above the oil level. Transformer cover need not be removed.



NEW easy mounting cuts installation time. Special slotted mounting bracket allows direct-pole mounting of models up to and including the 20-kw size.

. . and far easier to install and maintain



NEW simplified connections, quickly, without tools, by inserting the cable from either direction into the bushings and tightening the insulated handwheel.

G.E.'s new CC transformer for street lighting represents the most sweeping design advance in the industry in 50 years.

LESS FRICTION—It uses the magnetic suspension principle to completely support its moving coil. Thus, the only points of friction in the entire assembly are the two sleeve ball bearings which direct vertical movement of the moving coil.

LIGHTER WEIGHT—The new CC transformer is lighter and more compact, permitting pole mounting of larger ratings than was possible before. Grain oriented silicon strip steel in the core and aluminum wire in the moving coil conserve space and weight.

GREATER CONVENIENCE—Easy installation and servicing are assured by the simple mounting bracket, the cable bushings with their insulated handwheels. The access door on the side of the tank permits adjustments without removing the cover and reaching below the oil level.

VERSATILE—Designed to supply constant current for series street-lighting circuits, this new G-E CC transformer will operate efficiently with any type of lamp load.

MORE INFORMATION—Is available from your nearest G-E Apparatus Sales Office or authorized G-E street-lighting agent. Or write for Bulletin GEA-5975, Section 452-137, General Electric Company, Schenectady 5, N. Y.

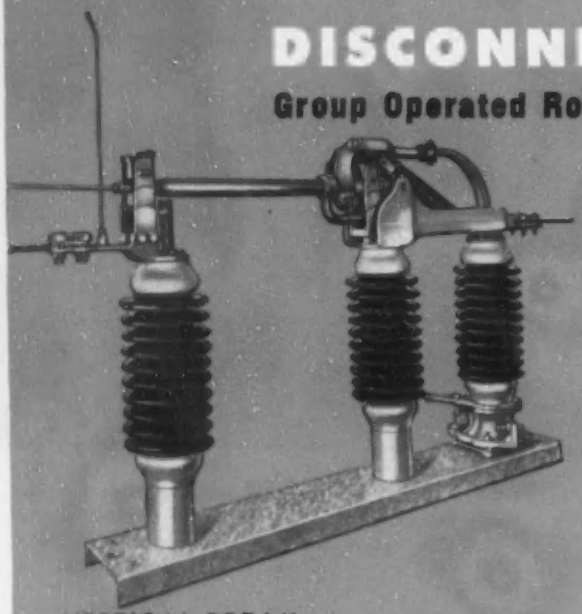
You can put your confidence in—

GENERAL ELECTRIC

Get easy "summer operation" all winter long with KEARNEY

DISCONNECT SWITCHES

Group Operated Rotating Insulator Type



VERTICAL BREAK

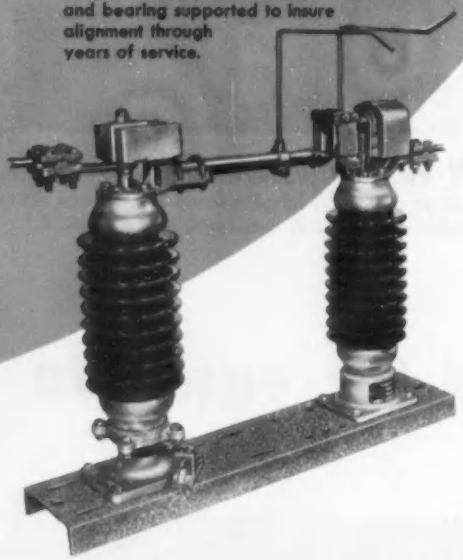
7,500 to 69,000 volts
400 Amps., 7.5 KV to 34.5 KV
600 Amps., 7.5 KV to 69 KV
1200 Amps., 7.5 KV to 69 KV

Only 3 moving parts. Simple, rugged, and completely adjustable for right or left-hand installation.

SIDE BREAK

7,500 to 69,000 volts
400 and 600 amperes

Only 2 moving parts. Heavily constructed and bearing supported to insure alignment through years of service.



Features:

- Positive current transfer from blade to line terminals through weather-protected high pressure contacts.
- Powerful tubular blade of electrolytic hard drawn copper, balanced and aligned.
- Easy adjustment for phase synchronization.
- No flexible shunts.
- Oilite bearings for easy operation.
- Both ends of blade seat in silver overlay contacts. No current transfer through hinge bearings on the rotating switch.
- Weather-sealed blade adjustments on side break switch.
- Ice-breaking, rotating jaw contact controlled by blade movements on side break switch.
- No springs or cams.

For Better Construction — Safer Maintenance

ENGINEERED TO OPERATE UNDER THE TOUGHEST ICING CONDITIONS

When you need them most they're on the job! These trouble-proof switches are ready to operate regardless of weather.

Smooth-operating, cool-running and corrosion-resistant, Kearney Rotating Insulator Switches bring you the utmost in modern disconnect switch performance.

Write today for complete information.

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. GUELPH, ONT.

JAMES R. KEARNEY CORPORATION
4224-42 Clayton Avenue • St. Louis 10, Mo.
Canadian Plant: Guelph, Ontario

Specify **KEARNEY Products**

250

Communication Integration . . .

. . . is discussed by Bell Telephone representative at Pennsylvania Electric Association committee meeting in New York

A new bid for the electric utility communication business was seen in Bell Telephone Co proposals at a recent Pennsylvania Electric Association Communications Committee meeting at New York.

Integration of existing private communications into jointly operated systems was the subject of a new contract described by V. O. Stanford, Bell Telephone Co of Pennsylvania, as "an interconnection agreement." Primary application of the new proposal would be to power systems with intercity rights-of-way, he said. Interconnection must use telephone company switching and connection facilities. Interconnection with privately owned telephone switchboards is prohibited, except for dispatching and at remote locations.

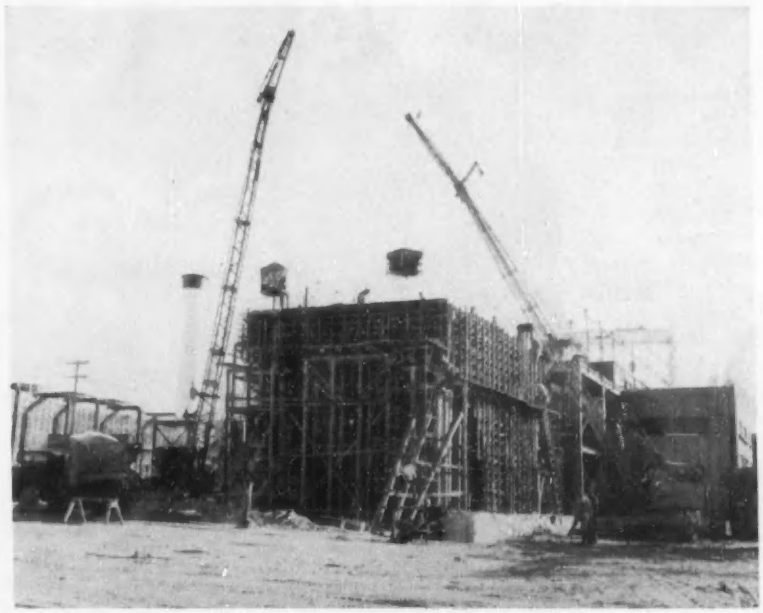
Stanford stressed provisions for signaling, metering, and control circuits. No restrictions are imposed upon equipment used for these purposes, as long as it coordinates with telephone plant, he said.

Rate Advantage . . . Specific advantage claimed by Stanford is ability to provide adequate service at reasonable rates. Correct accounting, he inferred, would show that telephone company facilities, stocks, research, and working forces can cut communication costs for power utilities.

Cooperative solution of telemetering, supervisory control, and similar problems by power company, manufacturer, and telephone engineers was proposed by W. C. Bowie, New York Telephone Co. He cited cases to prove that coordination guided by telephone experience would guard against faulty applications.

Utility Attitude . . . The electric utility attitude must be guided by cost, said W. C. Bryson, PEA Engineering Section chairman. He declared that many companies today have private communication systems because they were unable to satisfy their needs otherwise. Now they must decide whether it is advantageous to change to telephone company service, he said.

Several utility engineers conceded that the new proposal offers a better basis for solving communication problems. But their questions disclosed reluctance to abandon methods they have developed for private system use. Attempts to merge existing communications systems are still complicated by the traditional telephone company demand for complete control of voice channels which might link with their regular service.



Getting an Addition Under Way

One of the largest continuous pourings of concrete ever held in the New Mexico area marked the start of work on an addition to Public Service Co's Howard Person Station at Albuquerque (above). Two giant cranes were used in an 8-hr-53-min continuous pour of 355 cu yd of concrete.

The new unit will have a capacity of 33,000 kw and is scheduled for completion next Dec. 1. Howard Person Station now has a capacity of 40,000 kw in two units. The new 33,000-kw turbine will be the largest in the state. Pressure-fired boiler for new unit will be another first in New Mexico.

REA Sets Load Meeting of Co-ops, Manufacturers

Rural Electrification Administration is proposing to pump new life into program to help farmers make more and better use of electricity.

Its Administrator, Ancher Nelsen, has called a conference of electrical equipment manufacturers and rural electrification leaders in Chicago, March 11, where he hopes to get a united effort behind the program. The meeting will coincide with the meeting of National Electrical Manufacturers Association.

Representatives of National Rural Electric Cooperative Association and all statewide organizations of REA borrowers have been invited.

"Good use of electricity along REA-financed lines is one of the best hopes of REA electric cooperatives to remain a strong and vital force in American agriculture," Nelsen said.

In his letter of invitation, the REA head said: "While much work has been done to encourage the greater farm use of electrical equipment, it is our feeling that the surface has been barely scratched. It seems to us that if we can give the industry representatives an accurate picture of the great potentialities in the rural market, we can win their active assistance in the important job of expanding the power use program."

India and Pakistan: Hydro Plentiful, Rupees Scarce

● BOMBAY (McGraw-Hill World News)—Power development in India, and to a lesser extent in Pakistan and Ceylon, is in the process of tremendous expansion.

Blessed with the world's biggest mountains and some of its biggest rivers, South Asia has an almost unlimited hydroelectric potential. India, with an installed capacity of 2.3 million kw, reckons it has a potential capacity of at least 40 million kw. Pakistan, with only 144,000 kw, envisages an ultimate capacity of 6 million kw.

Both of the countries have ambitious industrialization plans and huge populations, which promise a demand for power commensurate with these hydroelectric resources—provided the power is cheap.

But right now, both countries have the same basic and as yet unsolved difficulty: Funds are insufficient to push forward power development fast enough for industrialization needs.

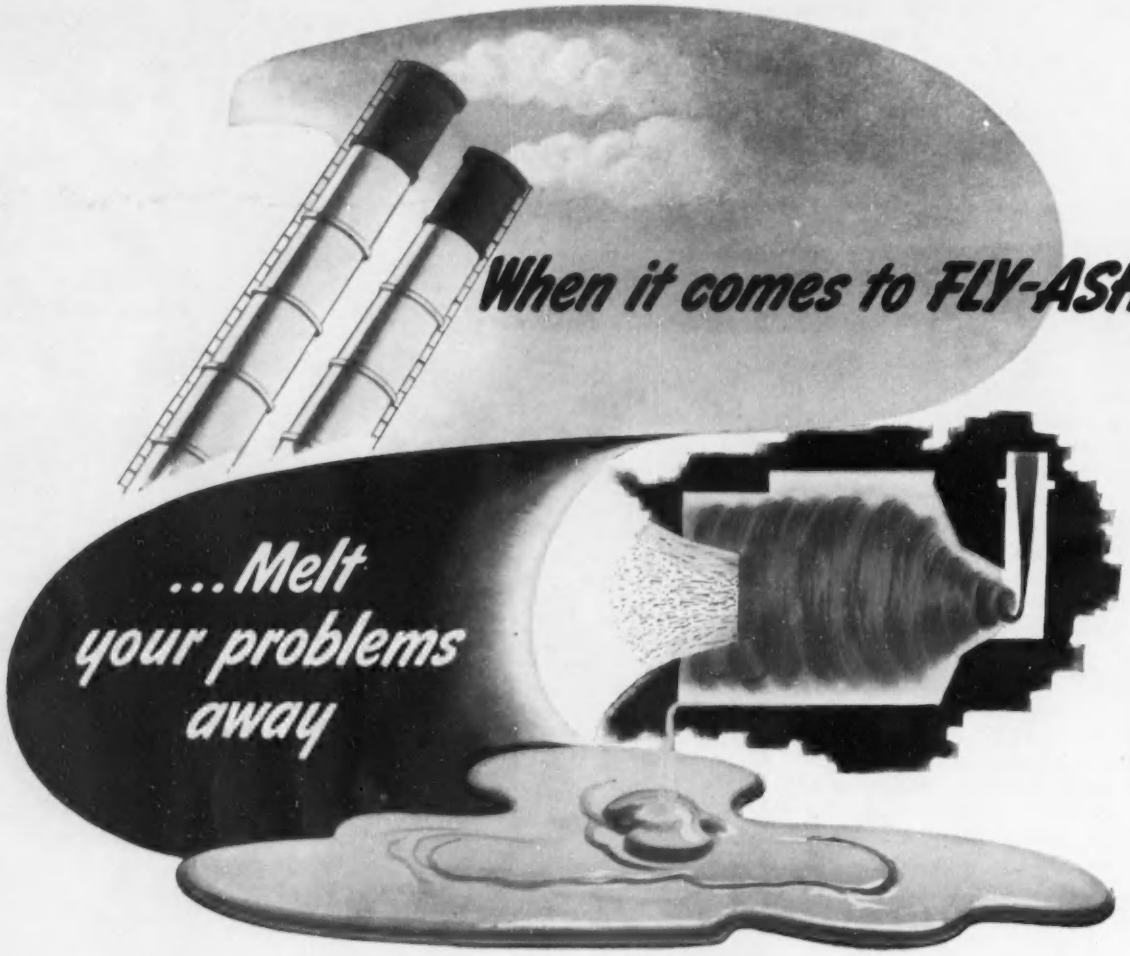
India's Program . . . India has tailored down its immediate needs to a five-year (1951-56) bid to add 1,080,000 kw to its present capacity. (When all the projects under construction or consideration in India are completed, they will add a further 6 million kw). But even this increase may not be attained. Schedule for the 48,000-kw Hirakud Project, for example, has been postponed—after $1.5 million, some of it U. S. technical assistance money, had been spent on one power house, channel and lower dam—because potential consumers are reckoned not yet sufficiently "power-conscious."

But even with delays, the year 1960 will see the completion of a hydro program in India far and away bigger than anything else in Asia. It will include the world's highest straight gravity dam (Bhakra in the Punjab) and, in Hirakud, the second longest after Fort Peck in the U. S. The 200,000-kw Bokaro thermal plant, completed last year under the supervision of International General Electric Co and the Kuljian Corp of Philadelphia, is the largest of its kind in Asia.

Emphasis Switched . . . Inherent in all South Asian power development today is a basic switch of emphasis from thermal to hydro power. Although new thermal stations are being built, in areas where hydro is at the moment insufficient or where local

India Hydroelectric power is making an increasing impression on the lives of the people. Here the tailrace of a hydro plant slacks off during lunch hour intervals in the mills, providing a ford for two workers and a bath for the buffalo

Pakistan Here, too, hydro someday will be king. Realizing this, Ghulam Mohammed, the governor-general, has taken an interest in its development. He is shown visiting Karnafuli multipurpose project at Kaptai in East Pakistan



Heavy discharge from stacks, or the alternative of expensive ash-collecting equipment with costly disposal . . . are problems faced by utility and industrial power plants burning coal.

With the B&W Cyclone Furnace, these problems literally can be melted away. Gone forever is the problem of stack discharge, the need for large ash-collectors, the costly nuisance of handling and getting rid of mountains of dusty, troublesome fly-ash.

For many plants, the low stack discharge with Cyclone Furnace firing will more than satisfy local requirements. Where ash precipitators are needed, they can be simple and inexpensive. Equally important, the ash collected in them can be piped back to the Cyclone and melted to slag. Thus, the fly-ash handling problem is eliminated, and the great economy of *one-point* slag accumulation and disposal is obtained.

Selected to fire some of the world's largest and most efficient boilers—the Cyclone Furnace offers down-the-line operating savings to utility and industrial steam plants. Through simplification of the entire process of coal preparation, combustion, ash segregation, and ash handling, the Cyclone makes possible economies in initial cost, operating labor, fuel consumption, and maintenance.

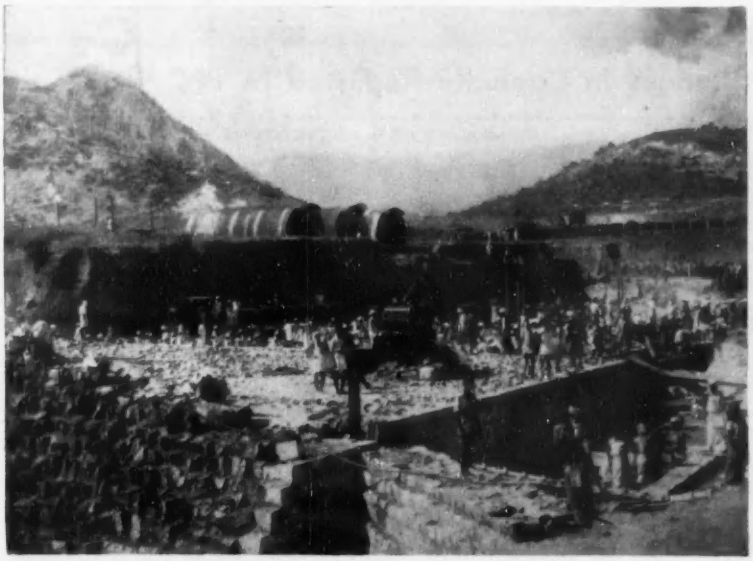
Cyclone-fired units thrive on a wide range of coals . . . do not bottleneck your plant operations when only poorer grades of coal are available. Cyclones burn crushed, not pulverized coal, and they burn it more completely. The turbulent action of the B&W Cyclone Furnace extracts—with less air—the maximum amount of heat from every bit of fuel, thus reducing both the amount of unburned carbon in the ash and the amount of heat-laden gas escaping up the stack. Cyclones with provision for firing oil and gas as well as coal can be switched from fuel to fuel very quickly without changes to firing equipment.

These are some of the dollars-and-cents benefits being enjoyed by owners of the many Cyclone-Furnace-fired boilers in operation—under a great variety of conditions—in different parts of the country. Based on this intensive, long-range experience, we will be pleased to discuss with you the advantages the Cyclone Furnace offers.

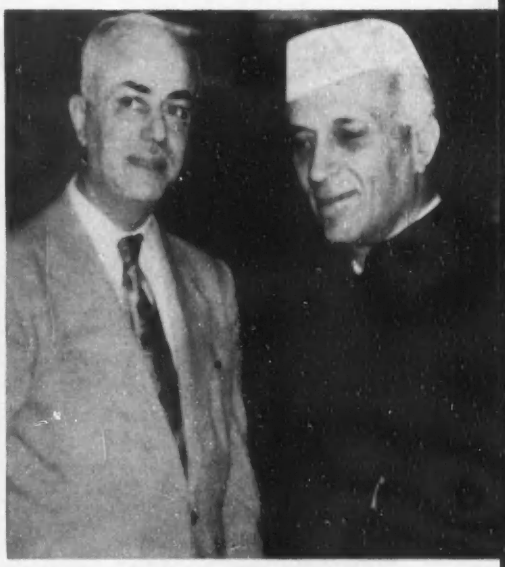
BABCOCK & WILCOX

BOILER DIVISION

N-165



BUILDING BY HAND, workers of Malampuzha Dam in West Madras Province of India literally put the masonry together piece by piece. With only low-grade coal available, power industry leaders recognize the country must turn to hydro electric generators to supply future needs



INDIA'S PRIME MINISTER NEHRU dedicated Bokaro Steam Plant near Calcutta, praised its builder, Harry Kuljian of Philadelphia firm

fuel is available or where transmission from a hydro project is too expensive, the ultimate aim is to reduce the ratio of thermal to hydro to something like 1:2. At present, with many hydro schemes still at blueprint stage, it is nearer 2:1. (Pakistan: 82,000 kw thermal against 62,000 kw hydro; India: 1.7 million kw thermal against 560,000 kw hydro).

All over the subcontinent, the story is the same. Demand and supply seldom match. As the new hydro projects near completion, the focus of the problem will change to transmission and distribution, which will have to meet somehow the low purchasing power of potential consumers. With the exception of India's Bihar, most industrial areas are remote from hydro centers. Thus in industrial Karachi, where coal costs $20 a ton and the nearest hydro scheme is 1,500 miles away, power costs three times what it does in un-industrialized frontier regions. Similarly, India's annual production of around 6 billion kwhr is mainly sold in and around big cities, where adjacent sources are thermal.

The Great Arc . . . India's principal hydro projects form a great arc round the north and east of the country (See map). In these projects, a little over a billion dollars will be needed to install a little over a million kw—but the same outlay will irrigate about 17 million acres of land. The three biggest projects (Bhakra-Nangal, Damodar and Hirakud), which alone account for 338,000 kw in this five-year phase, are all multi-purpose, and receive priority for this reason.

Most of the money for India's expansion program comes from public loans. But these will not be enough. It is no secret that the overall Five-Year Plan involves a billion-dollar deficit. To help meet this, so far as it affects power development, the World Bank has advanced India $30 million for the Damodar Valley Project and U. S. Technical Cooperation Administration has put more than $10 million into river valley development under agreements signed in 1952 and 1953. But the program still lags seriously.

Just how much of this lagging may be due to governmental bumbling and how much to a real shortage of resources is a popular controversy. One thing is certain: under present policies in both India and Pakistan the stake of private enterprise in electric power will not increase. (Industry and the railroads own about one fourth of India's present generating capacity.)

Pakistan's Approach

Two factors distinguish Pakistan's approach to power development from that of India: (1) there is a greater awareness of its strategic importance and (2) where India has at least sufficient funds to initiate its projects, those of Pakistan have to remain on paper till someone outside of Pakistan banks them. Like everything else in Pakistan, power development is made peculiarly difficult by the fact that the country is split in two. In addition, West Pakistan, where the hydro potential is located, has its population and industry in the south, as far as could be from its power sources in the north. Most of Pakistan's 1953 production of 300,164,000 kwhr was generated in small thermal stations serving only the towns in which they are located. In addition, Pakistan's Punjab bought 44,629,000 kwhr from the Mandi power project in India.

Canada Helps . . . The hydro project furthest ahead in Pakistan is the Warsak Dam, about 18 miles from Peshawar in the North-West Frontier Province, for which the Canadian Government has put up $7 million under the Colombo Plan. Expected to be ready in six or seven years, Warsak will have an installed capacity of 150,000 kw and along with the Mianwali project in the Punjab (100,000 kw) and the Karnafuli in East Bengal (160,000 kw) will bring the national capacity to its 1960 expectation of 633,000 kw.

Recently the discovery of natural gas at Sui, 300 miles north of Karachi, has raised hopes in Pakistan of cheap

thermal power. Shortage of suitable fuel (Pakistan has only low-grade coal) has been a main reason for restricted power development to date.

It is nobody's fault that most of the $1½ billion dollars' worth of hydro expansion slated for the next few years in India and Pakistan lies parallel to the borders of the Soviet Union and China. Insofar as the provision of cheap power will help raise the two countries' low standard of living, which is at present a source of aid and comfort to their Communist Parties, power development does aid the fight against Communism. But there is no correlation discernible, even in the more Communism-conscious Pakistan, between defense and electric power. India's "Ruhr Valley," which is springing up around the Damodar project, lies in territory which is strategically most vulnerable, a fact about which no one seems to bother.

Ceylon's Development

Defense is one problem which does not concern the smallest of the three Asian Commonwealth members—Ceylon—whose power development program drew favorable mention from a World Bank Mission which reviewed the country's economy in 1952. The program's main emphasis is on the substitution of hydro (now 35,300 kw) for thermal (now 11,500 kw steam and 96,600 kw diesel).

With an annual output of about 100 million kwhr, (equalling about 13 kwhr per annum per capita) Ceylon stands ahead of Pakistan (4 kwhr per annum per capita) and just behind India (15 kwhr). Although it has no Himalayas, it does have mountains and rivers which afford a calculated potential capacity of about 1 million kw.

Like its bigger neighbors, Ceylon is faced with the choice of delaying its industrialization till its long-term hydro schemes come through or else of engaging in quicker and more expensive thermal expansion. To all three countries, which have to import most of their fuel, this is the toughest dilemma of all.

It is basically a choice between expensive power now or cheap power in the distant future. No one has really solved this problem except by trying it both ways and, in view of everyone's limited finances, this could be the least rewarding answer.

Changes in Capacity Reported to FPC

PLANT ADDITIONS DURING NOVEMBER

State	Utility	Plant	Fuel	Capacity Kw
Conn.	Connecticut Light & Power	Thompsonville	S	5,000
N. Y.	Consolidated Edison	Astoria	S	180,000
N. Y.	Plattsburg Municipal Lighting Department	Plattsburg	IC	1,136
N. Y.	Long Island Lighting	Far Rockaway 2	S	90,000
N. J.	Public Service Electric & Gas	Kearny B	S	145,000
Ohio	Clyde Municipal Light Department	Clyde	IC	2,840
Ill.	Rochelle Electric Light & Water Department	Rochelle	IC	2,400
Mich.	Detroit Edison	St. Clair	S	125,000
Mich.	Consumers Power	Whiting	S	106,000
Mich.	Marshall City Water & Electric Works	Marshall	IC	1,130
Iowa	Bellevue Municipal Water, Light & Power Plant	Bellevue	IC	928
Iowa	Iowa Southern Utilities	Bridgeport	S	20,000
Iowa	Iowa Southern Utilities	Bridgeport	S	20,000
Fla.	Tampa Electric	Hookers Pt.	S	40,000
Fla.	Florida Power	Suwannee	S	30,000
Fla.	Florida Power & Light	Riviera	S	56,470
Tenn.	Army Corps of Engineers	Dale Hollow	H	18,000
Miss.	Mississippi Power & Light	Delta	S	99,000
Okla.	Southwestern Power Administration	Tenkiller Ferry	H	34,000
Tex.	Electra Light Department	Electra	IC	1,250
Colo.	Western Colorado Power	Jim Bullock	S	5,000
Utah	St. George Utility Commission	St. George	H	420
Utah	St. George Utility Commission	St. George	IC	4,003
Ore.	California Oregon Power	Clearwater	H	26,000
Calif.	Southern California Edison	Etiwanda	S	100,000
Calif.	Glendale Public Service Department	Glendale	S	20,000
Calif.	California Electric Power	Highgrove	S	40,000

PLANT RETIREMENTS DURING NOVEMBER

Pa.	Pennsylvania Electric	Yeagertown	H	300
Pa.	Pennsylvania Power & Light	Carlisle	H	450
Pa.	Pennsylvania Power & Light	Womelsdorf	H	75
Pa.	Pennsylvania Power & Light	Goodspring	S	8,000
Mich.	Consumers Power	Ceresco	H	600
Mich.	Marshall City Water & Electric Works	Marshall	IC	360
Mo.	Ozark Border Electric Cooperative	Puxico	IC	200
Kan.	Western Light & Telephone	Downs	IC	236
Va.	Appalachian Electric Power	Niagara	H	2,760
Va.	Virginia Electric & Power	Woodstock	H	294
La.	Ruston Municipal Water & Light Department	Ruston	IC	270
Colo.	Gunnison County Electric Association	Crested Butte	IC	300

H—Hydro, IC—Internal Combustion, S—Steam
United States Capacity as of Dec. 1—Hydro, 21,677,646 kw; Internal Combustion, 2,149,087 kw; Steam, 65,960,157 kw; Total, 89,786,890 kw.

More KW Needed to Avert NW Shortage in '60: Pearl

Although the present power picture is good, the Pacific Northwest faces power shortages beginning in about 1960 unless additional generating facilities are undertaken soon, the Northwest Utilities Conference Committee agreed at a recent meeting in Tacoma, Wash.

The meeting was the first attended by William Pearl, new head of the Bonneville Power Administration.

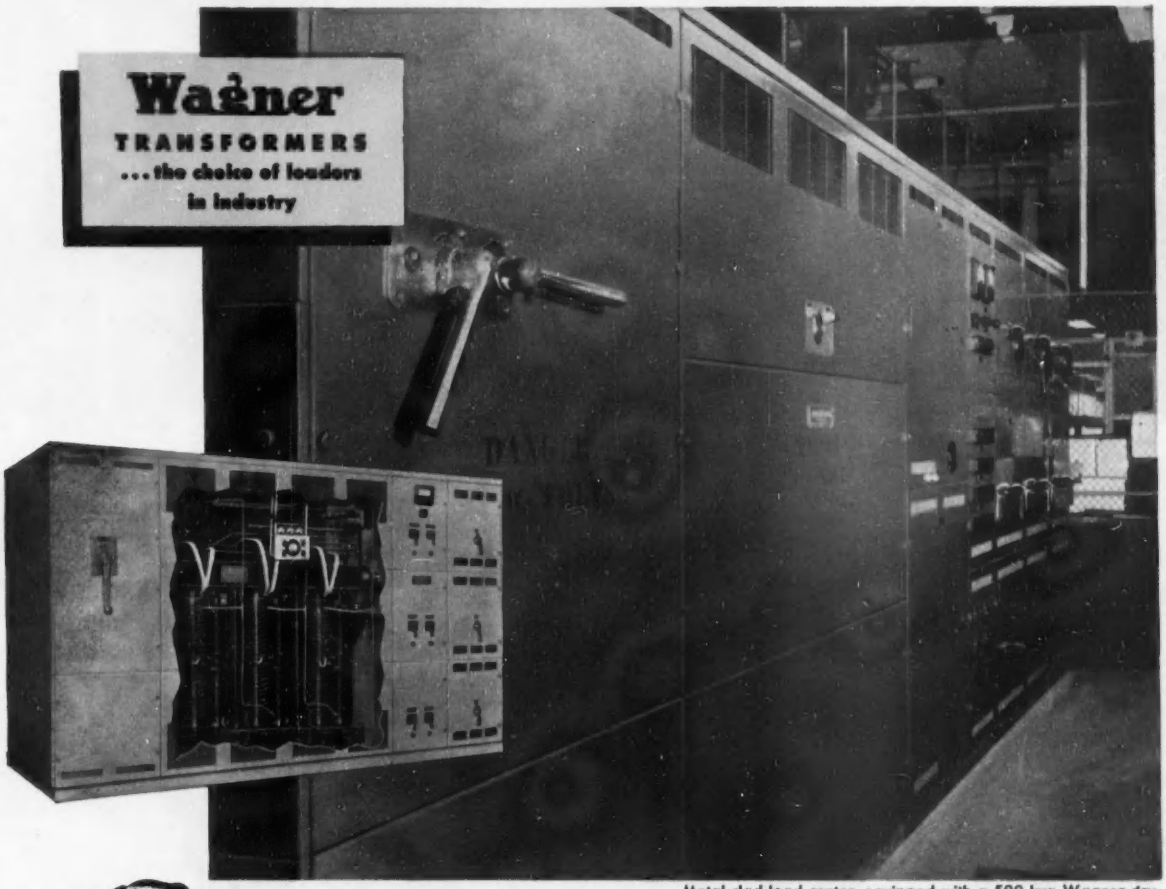
"There definitely will be a power shortage in this region in the future," said Pearl. "The sooner private and public power agencies can get together as partners, working to provide needed facilities, the sooner the power problem will be solved."

C. A. Erdahl, acting director of Tacoma municipal utilities and chairman of the committee, declared that "what is needed is a meeting of the minds on a partnership program of both private and public agencies for construction of generating facilities."

Pearl told the committee that the pending rate raise on Bonneville power will be held up for study at least until next December.

To Move Central Office

New Jersey Power & Light Co plans to move its central office from Dover, N. J., to a site on Route 53, Denville. The shift will be made in the spring of 1955. The utility will erect a new office building, which will cost more than $1 million, at the Denville site.



Metal-clad load-center, equipped with a 500 kva Wagner dry-type transformer, at Western Electric Company, Allentown, Pa.

...to keep their voices smiling

For as long as we can remember, telephone companies have been doing a better job every year. Equipment improves—users get better service—and operators keep their voices smiling. Much credit for this continued progress must go to the Western Electric Company, which has devoted more than 70 years to the manufacture of the dependable equipment and apparatus that help make our telephone service the finest on earth.

In addition to telephone manufacture, Western Electric also turns out much special equipment for America's Armed Forces.

At Western Electric's Allentown, Pennsylvania plant, better workmanship and employee morale are encouraged by an exceptionally fine lighting installation. 17,500 high-level fluorescent lamps, augmented by local lighting, help employees perform delicate operations on tiny parts.

Power for this lighting load, and for more than 5000 pieces of production equipment, is supplied by seven load-center substations, each equipped with a 500 kva Wagner Dry-Type Transformer.

Wagner Transformers are an important part of the equipment of many great industrial plants. In every case they are adding to their reputation for complete dependability . . . for unfailing service . . . that helped to influence Western Electric to install Wagner Transformers.

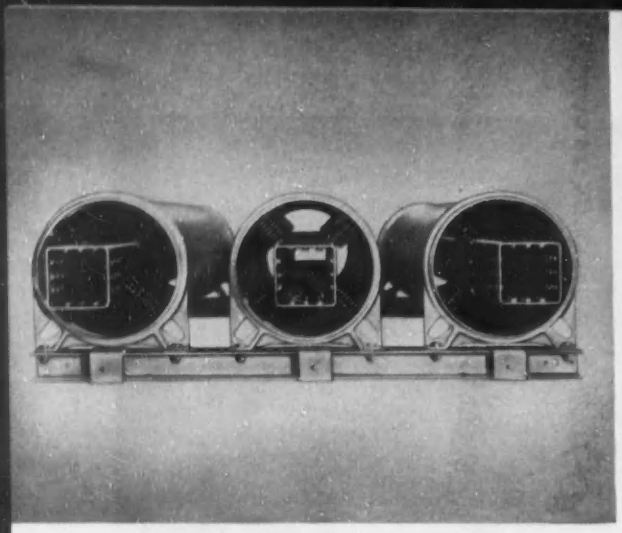
A Wagner engineer can help you select the right transformer for *your* requirements. Consult the nearest of our 32 branch offices, or write us.

WAGNER ELECTRIC CORPORATION
6456 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

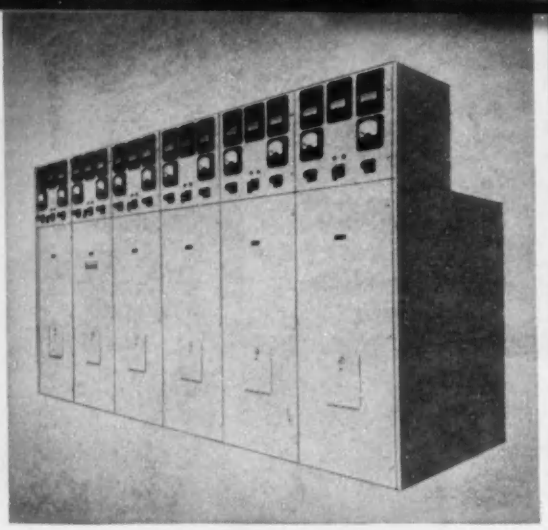
BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE
BRAKE SYSTEMS—
AIR AND HYDRAULIC

WT53-3

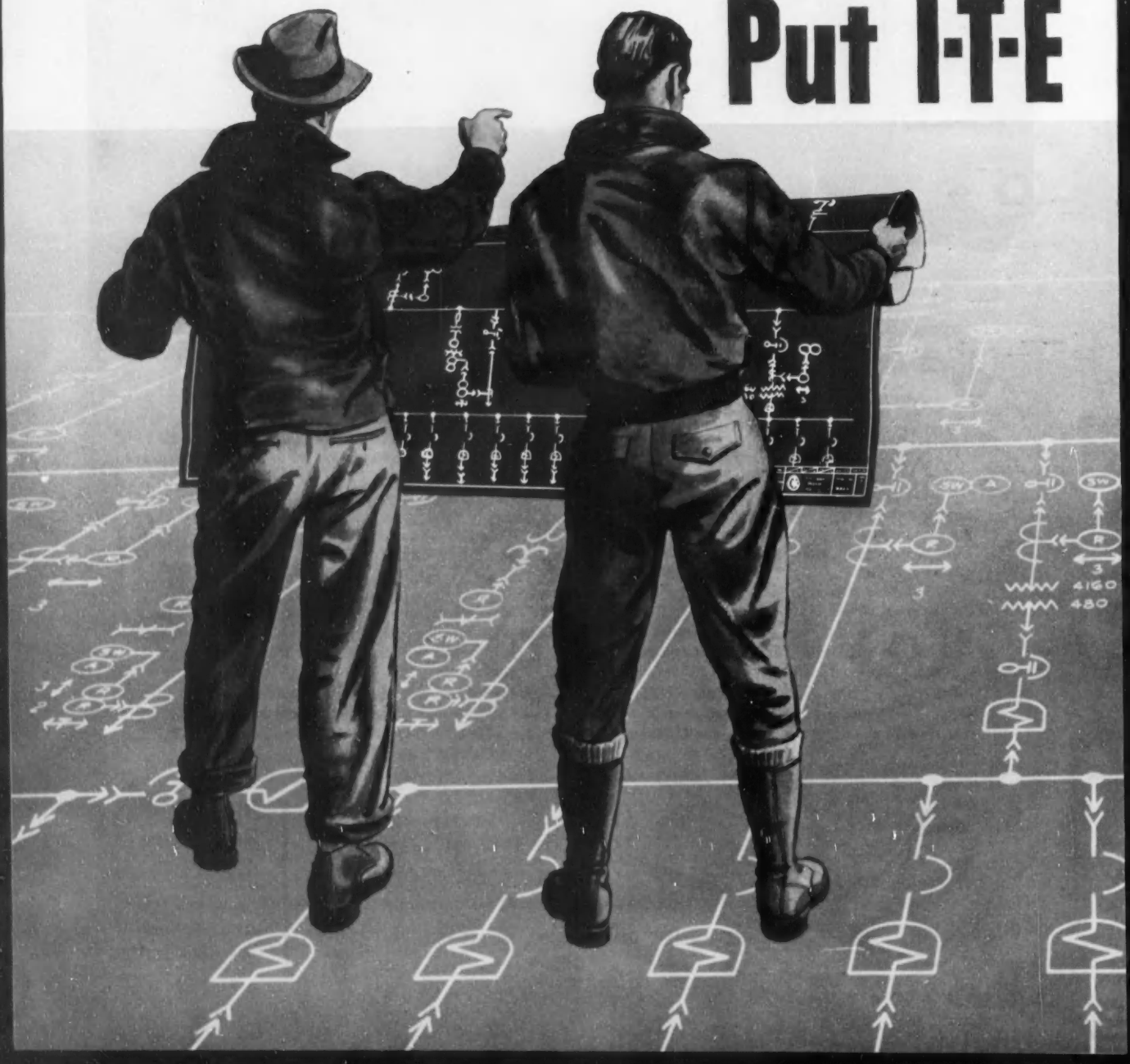


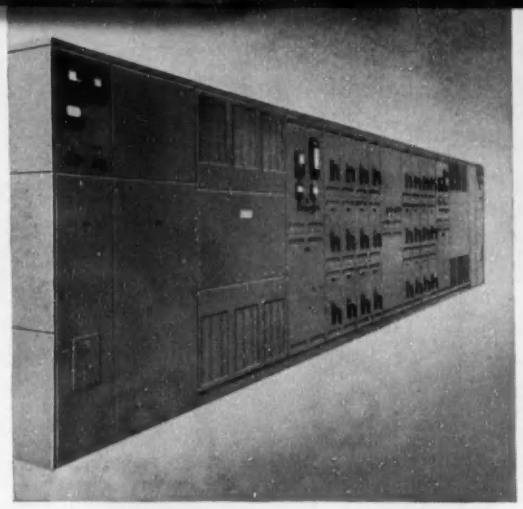
METAL-ENCLOSED BUS STRUCTURES



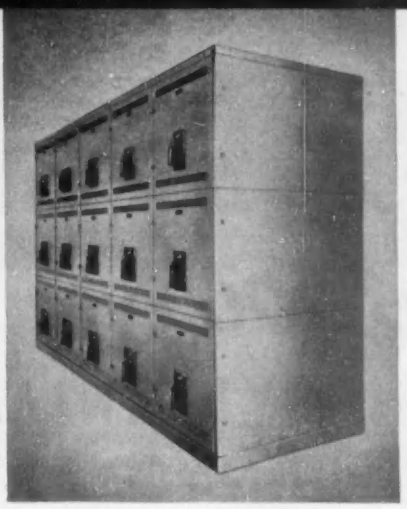
METAL-CLAD SWITCHGEAR

Put I-T-E

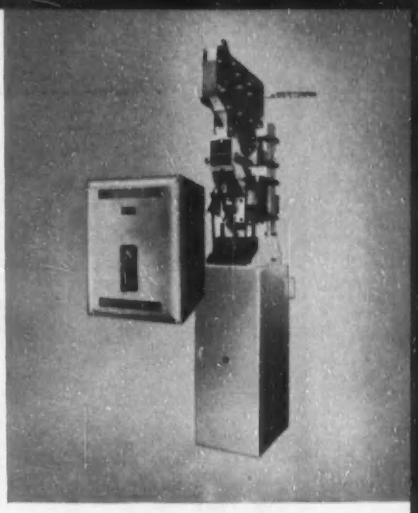




UNIT SUBSTATIONS



LOW-VOLTAGE SWITCHGEAR



LARGE AIR CIRCUIT BREAKERS

in your power plans...

for Dependability, Safety, and Over-all Economy

A complete line of Quality Switchgear Equipment

From generation to utilization, I-T-E quality equipment serves every industrial and commercial application. Whether your plans include bus structures, metal-clad or low-voltage switchgear, unit substations, or individual circuit breakers—you are assured of I-T-E's many *extra-service* benefits, which include:

1. selection and application of equipment
2. preparation of specifications
3. coordination of all job requirements

Power is fundamental in any new plant construction or expansion. Power distribution systems must be planned to assure maximum dependability of service, safety for personnel and equipment, and *over-all* economy—from initial planning . . . through the life of the equipment.

Furthermore, it is important to plan power systems with an eye to the future. They should be adaptable to changing plant requirements for many years ahead.

For these reasons, it pays to include I-T-E quality products in your power plans. For over 65 years I-T-E has set the standard for the industry—through engineering skill, design refinement, and introduction of new ideas and thinking.

For details, contact the I-T-E field office nearest you. Look in your classified telephone directory under "Electrical Equipment."

THE SYMBOL OF QUALITY SWITCHGEAR

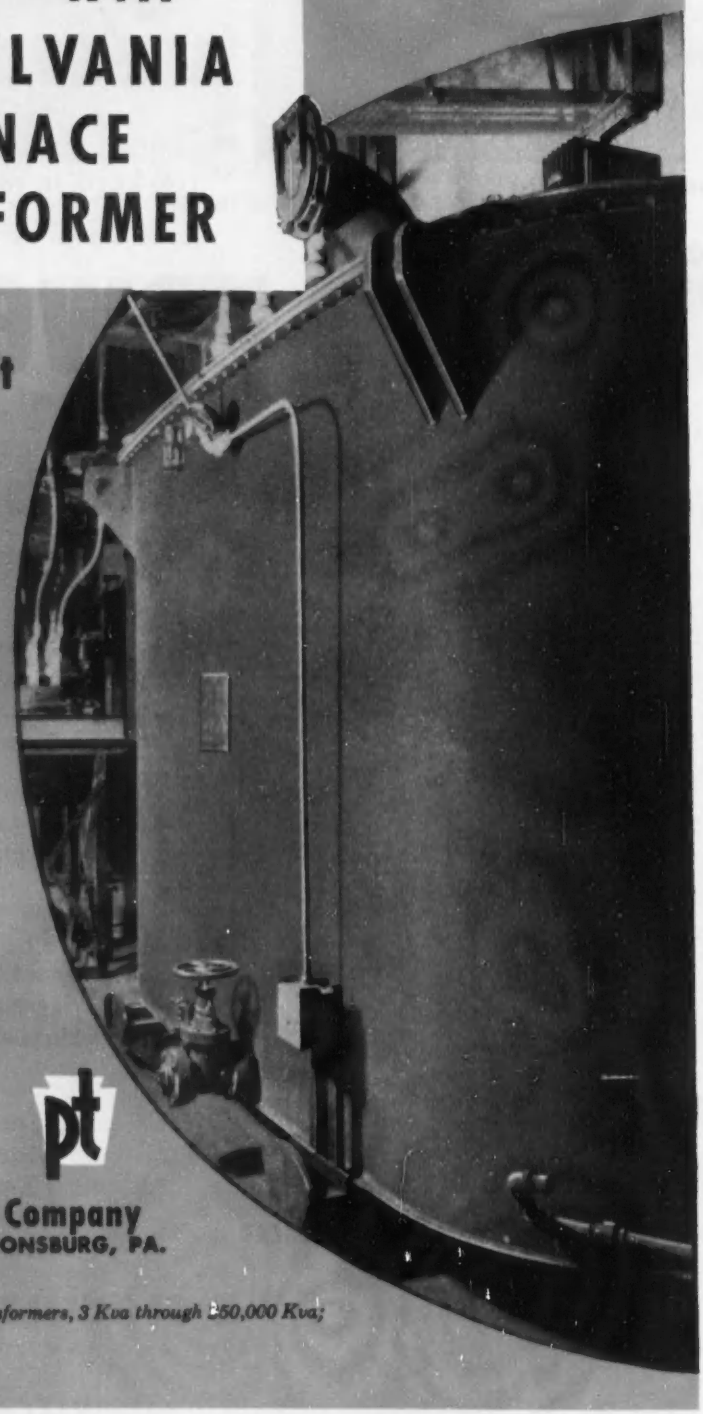
I-T-E CIRCUIT BREAKER COMPANY

19TH AND HAMILTON STS. • PHILADELPHIA 30, PA.

SWITCHGEAR PRODUCTS

New Jersey Zinc uses this

6,000 KVA PENNSYLVANIA FURNACE TRANSFORMER



at its Palmerton Plant

Pennsylvania Transformer Company has manufactured well over 1¼ million Kva of furnace transformers in ratings from 100 Kva through 25,000 Kva. The 6,000 Kva transformer at Palmerton is one of five furnace transformers purchased from Pennsylvania by New Jersey Zinc Company (of Pa.).

The successful operation of all Pennsylvania furnace transformers and their industry-wide acceptance indicate that Pennsylvania engineers fully understand the application of furnace transformers to electric furnaces.

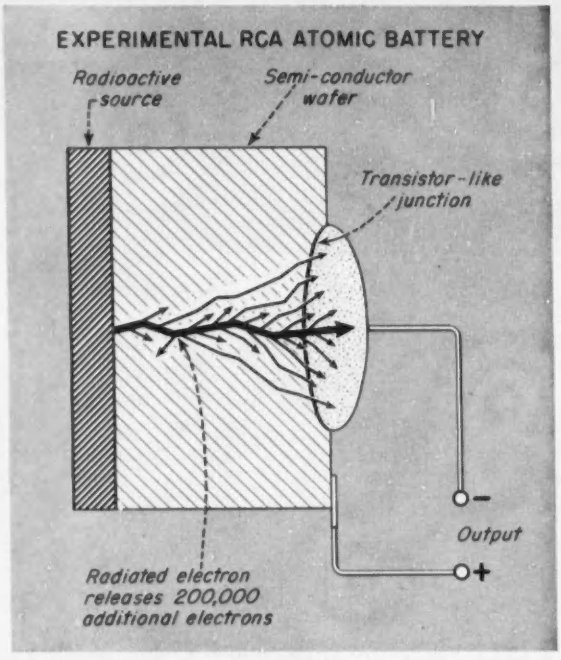
The complicated design of a furnace transformer presents many problems that do not apply to other types of transformers. Many special conditions, such as overloads, short circuit stresses, distribution of currents, and reduction of losses must be met by engineering skill and highly perfected workmanship. Pennsylvania Transformer Company combines this engineering "know-how" and expert workmanship into each and every furnace transformer.

Pennsylvania Transformer Company

A McGraw Electric Company Division • **CANONSBURG, PA.**

Greater Pittsburgh District

Manufacturers of Power and Distribution Transformers, 3 Kva through 250,000 Kva; 480 volts through 330,000 volts.



SIMPLIFIED DRAWING of atomic battery shows its construction. Total electrons released each second are in the billions. Output is small

MAGNIFIED MODEL shows cylinder, right, which is coated with radioactive material on its face which is next to transistor-like wafer

Atomic Cell: Trillion Microwatts Shy

"The Electron-Voltaic Effect in P-N Junctions Induced by Beta Particle Bombardment" is the innocuous-sounding title of a recent article by Paul Rappaport in the "Physical Review." Nevertheless, it is the basis for the Radio Corp of America announcement that atomic energy can now be converted "directly and simply" into small but usable quantities of electrical energy.

In structure the new cell is not greatly different from the transistor announced some years ago by Bell Telephone Laboratories. Both consist of a small amount of one metal attached to another metal or semi-conductor. The difference is that the "atomic cell" develops an externally usable voltage while the transistor merely acts as a rectifier and/or amplifier. The former further requires a transistor-like junction on the opposite face of the semi-conductor.

It could conceivably require nearly a billion of the cells to generate 1 kw, say 167 amp at 6 v. The reason is that while the cell develops ¼ v on open circuit, it produces much less when delivering 5 millionths of an ampere into an external circuit (a transistor-oscillator) or a telephone receiver. This capability is a side result from research given support by the U.S. Air Force and aimed at enlarging the knowledge of the electronics of the solid state.

As to possibilities that energy from such a cell or cells will replace the steam generating plant, the outlook is not encouraging. Characteristics of the new cell must be jacked up from the microwatt to the megawatt level. That is a spread of a million times a million for research to crack.

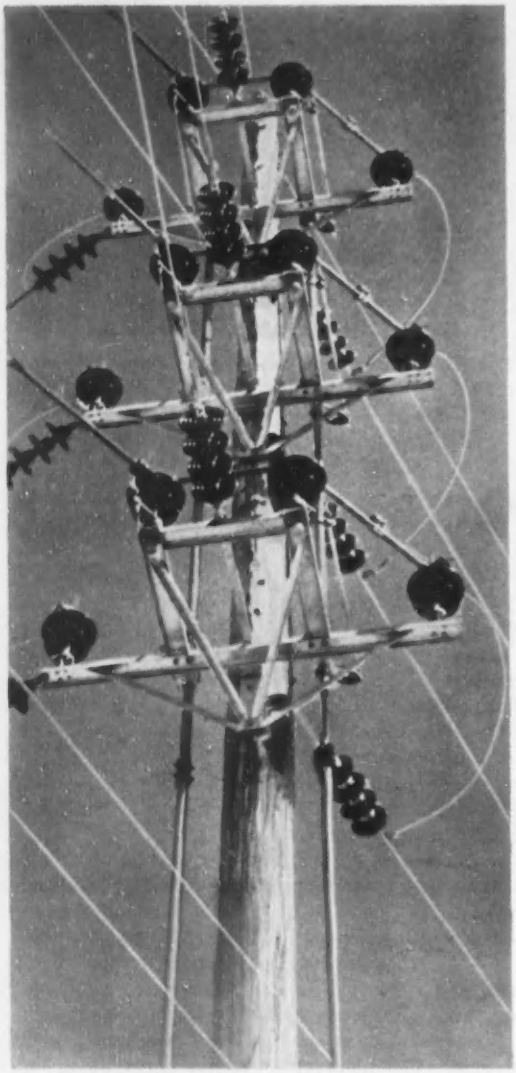
The metal used in the cell is strontium-90 which is abundant among waste products of fission of uranium from a nuclear reactor. It gives off beta particles (electrons) at high velocity for 20 years before the better half of its radioactivity is dissipated. In the cell a $\frac{1}{8}$-in. cube of strontium is spread in a thin layer against the surface of a semi-conducting crystal wafer, such as silicon alloyed with antimony.

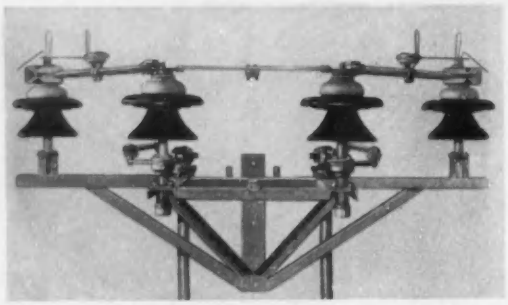
What makes the resulting cell unique and significant is that each of the billions of electrons emitted each second by the strontium releases 200,000 more electrons from the wafer alloy. Previous radioactive generators merely made available one electron for each one emitted at the source. Of course, the 200,000 electrons are of the low-speed class. But their pileup on the surface of the wafer on a continuous basis is what establishes the sustained voltage and output of the cell.

Strontium-90 is not available in wholly pure form. When it becomes available, it may be expected that efficacy of the cell will be enhanced and that shielding for protection of personnel can be omitted. Strontium 90 available today is associated with other radioactive materials which often emit gamma rays requiring shielding.

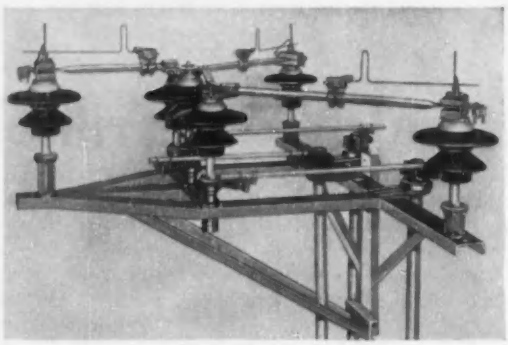
The external resistance of the cell has been given as 10,000 ohms. No internal resistance was announced, but an internal resistance approximately equal is characteristic of communication and electronic circuits. Power circuits comprise far smaller resistances. Therefore before the atomic cell can replace present utility generation methods, its internal resistance must be greatly reduced.

MATTHEWS GOABS CUT SWITCHING COSTS





Shown above is one phase of a Matthews three-phase, two-way Gang Operated Air Break Switch (GOABS). Matthews Goabs are capable of interrupting exceptionally long lines of charging current. In field tests over 65 miles of 66 KV charging current was broken successfully.



With this three-way Matthews GOABS (one phase shown), substation switching, loop inter-connecting or sectionalizing can be accomplished from one switching point. Each set of blades is individually operated.

Matthews GOABS *do* cut installed costs at least 25% because: only one pole per switch is needed . . . minimum right-of-way is required . . . requirements for construction materials are reduced . . . ease of installation saves valuable line-crew time . . . fewer sectionalizing switches are necessary on long transmission lines due to the ability of GOABS to break long lines of charging current. Developed by Matthews less than four years ago, GOABS have been put into service by a great many power companies—in 33 states, Alaska, Hawaii and Puerto Rico. Available in 600 amperes, 15, 23, 34.5, 46, and 69 KV ratings. Write for Bulletin 601-A for more complete information.

W. N. MATTHEWS COMPANY

DIVISION OF THE A. B. CHANCE COMPANY

3850 DELOR STREET • ST. LOUIS 16, MO.

DISCUSSION is held by E. G. Lindquist, Fairbanks-Morse; D. L. Smith, Durion Co; H. C. Williams, Reynolds Metals; and T. A. Kerr, Northern Cyanamid, at Chicago maintenance conference

Preventive Maintenance Urged

Gravely cites time savings of 50% in down time of electric furnaces at national conference held in Chicago

Techniques in the care and upkeep of electrical equipment in factories and commercial buildings came in for careful scrutiny at the National Plant Maintenance and Engineering Conference in Chicago, Jan. 25-27. All kinds of equipment were discussed from lamps to transformers and from capacitors to electric furnaces.

One outspoken advocate of preventive maintenance, O. W. Gravely, Electro Metallurgical Division of Union Carbide & Carbon Co, said down time of electric furnaces in his plant had been cut 50% and that 20% fewer hours were required by preventive than breakdown maintenance. But Gravely warned against overdoing preventive maintenance and incurring excess paper work. In his plant the maintenance man spends two or three days a week on inspection and the rest of his time on maintenance. Some 5,000 motors are checked monthly and dust cleaned out due to the highly abrasive operating atmosphere. Monthly motor maintenance cost is $1,200, he said.

General Electric Co follows the area-maintenance philosophy, according to R. D. Knies. Work is done more quickly that way, he said, than with central maintenance.

Maintenance men generally agreed that the major high-voltage maintenance problem is with cable failure. "Meggering" cable only, is not enough, they said; cable must be given periodic high potential tests. It was also agreed that most cable failures result from cracks in the lead sheath. These and other points that grew out of general floor discussion, led by R. M. Ryan, General Electric, included:

1. On bus duct systems, connections should be cleaned and tightened annually. On systems where stop nuts have been used the bus duct has required no attention for ten years.

2. Transformer maintenance has been reduced by better insulating oils. Askarel does not develop sludge like regular transformer oil. It is toxic to some personnel.

3. Carbon tetrachloride should be abandoned for cleaning electrical equipment because of its toxic nature.

4. Capacitors should be kept clean of dust and oil accumulations. Trouble due to voltage rise can be avoided through use of switching capacitors.

Group lamp replacement was a hot subject in the lighting maintenance discussions. Care in the selection of lighting equipment was stressed. There was considerable interest in explosion proof and vapor proof equipment for hazardous areas. The trend toward creating an office environment in the factory by the use of lighting fixtures with more upward lighting components is gaining momentum.

Americans to Participate in CIGRE's May Meeting

More than 1,400 electric utility leaders from 41 different countries are expected to attend the International Conference on Electric Systems (CIGRE) scheduled to be held May 12-22 at Paris, France.

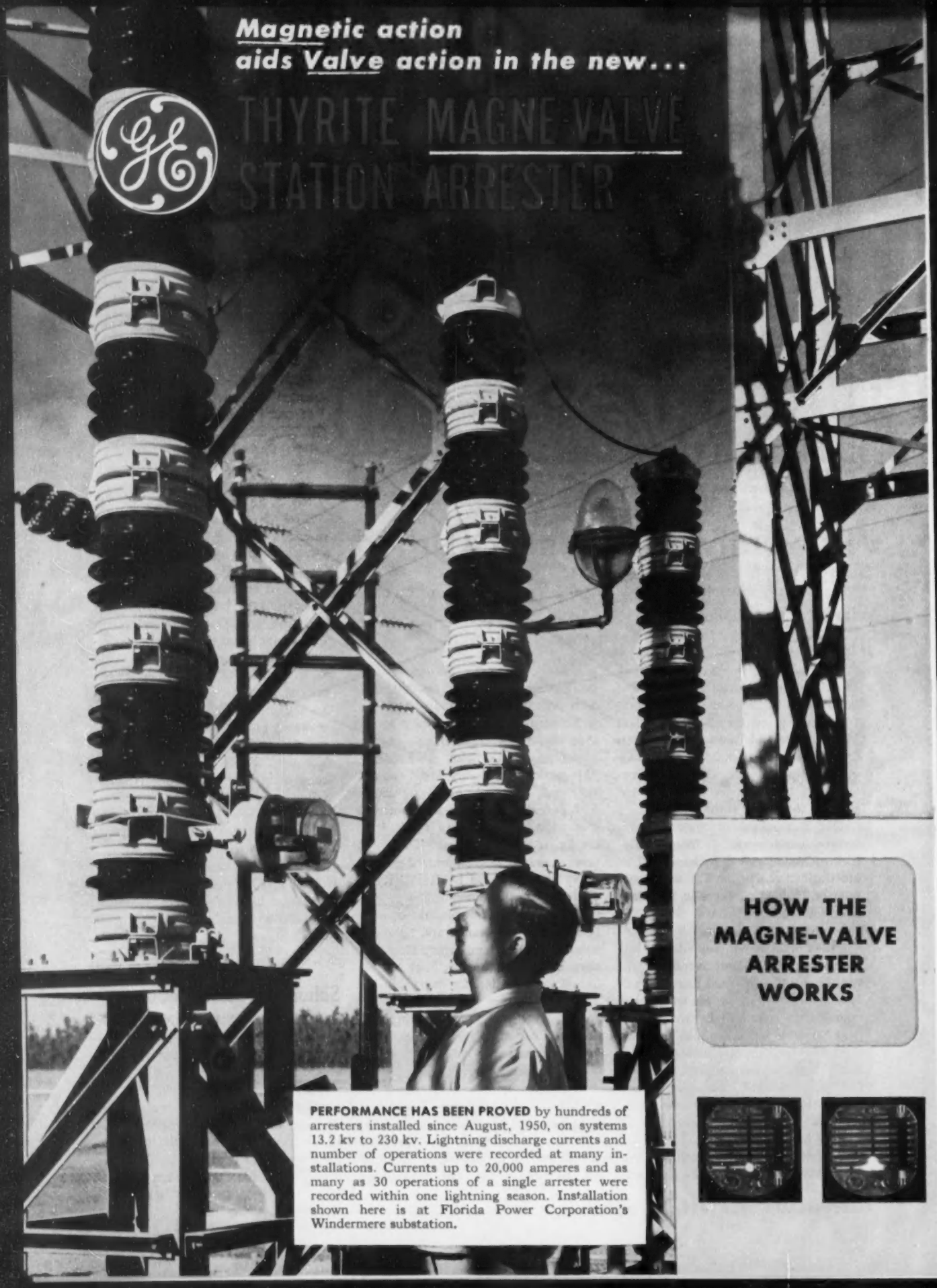
Highlight of CIGRE's agenda will be presentation of ten technical papers by the U. S. National Committee. In one of the papers an analysis of American Gas & Electric Co's 330-kv systems is made by F. A. Lane, G. H. Kinghorn, and F. M. Porter. Other subjects to be handled by the American committee include relay protection, series capacitors, and dielectrics.

New officers of the American committee who will take over the U. S. phase of CIGRE operations at the conclusion of the 1954 Paris convention include: Philip Sporn, president, American G&E, who becomes chairman to replace the new honorary chairman, Frederic Attwood, vice president of Ohio Brass Co; Howard Melvin, chief consulting engineer, Ebasco Services, Inc, vice chairman; and I. W. Gross, American G&E, secretary-treasurer.

Further information about the convention can be obtained from Gross, who makes his headquarters at American G&E's New York office at 50 Church St.

School to Build Reactor

Pennsylvania State University will construct and operate at its own expense a nuclear reactor for research and training of students. The low-power reactor, for which Atomic Energy Commission will provide fissionable material, is the second privately owned reactor in the country. First went into operation at the University of North Carolina last year.


Magnetic action
aids Valve action in the new...
THYRITE MAGNE VALVE
STATION ARRESTER
HOW THE MAGNE-VALVE ARRESTER WORKS
PERFORMANCE HAS BEEN PROVED by hundreds of arresters installed since August, 1950, on systems 13.2 kv to 230 kv. Lightning discharge currents and number of operations were recorded at many installations. Currents up to 20,000 amperes and as many as 30 operations of a single arrester were recorded within one lightning season. Installation shown here is at Florida Power Corporation's Windermere substation.

20% better protective level
3 times greater endurance

The new Thyrite* Magne-valve arrester is a major advance in reliability of co-ordinated protection of station apparatus. Let's appraise it!

FOR APPARATUS HAVING STANDARD BIL'S—

You get an unprecedented margin of protection that assures co-ordinated protection for many times higher stroke currents—even 100,000 amperes. This super-protection is especially valuable where lines or substations are not shielded or where practicable shielding may not be infallible.

You get an extra margin of protection which tends to offset adverse effects of separation between arrester and apparatus—enabling co-ordinated protection to apparatus at greater distances from the arrester.

FOR H-V APPARATUS HAVING REDUCED INSULATION—

You get as large a margin of safety in protecting 1-step reduced BIL insulation as was heretofore possible only when protecting full insulation (standard BIL). Hence, the new arrester enables a more positive approach toward reduced insulation and resulting tremendous savings in apparatus investments.

FOR DRY-TYPE TRANSFORMERS—

You get a good margin of protection—heretofore limited. Although oil- or askarel-filled transformers are distinctly preferable for connection to lines exposed to lightning, the decidedly lower impulse strength of dry-type transformers can now be better protected.

FOR APPARATUS HAVING DEPRECIATED INSULATION—

You get more positive protection—to preserve and greatly extend the operating life of old but important apparatus.

**Reg. Trademark of General Electric Co.*

FOR AC ROTATING MACHINES—

You get as good margin of protection to even impedance-grounded neutral rotating machines using ungrounded-neutral 100% rating arresters, as was heretofore practicable with only grounded-neutral 80% rating arrester. And for grounded-neutral machines, you can now limit the lightning stresses to 80% of the machine's 1-minute hi-pot test level. Both are important achievements for better protection of generators, synchronous condensers, and motors, alike.

FOR ALL THESE APPLICATIONS—

You get full-fledged uncompromised ***station*** arrester protection—6-inch diameter low-resistance Thyrite valve-disk with exclusive integrally fired ceramic insulating collar, the most efficient valve element ever offered.

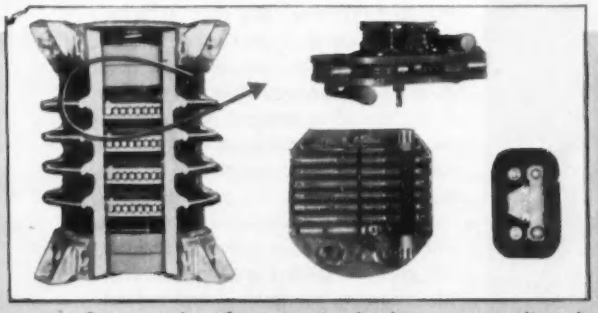
You get straight-in-line, low-resistance discharge path—28 sq. inches of cross-sectional area, with no tortuous up-and-down impedance.

You get over 3 times greater discharge capacity and thermal endurance—plenty of "guts" for withstanding high lightning currents, multiple lightning strokes, long-duration lightning discharges and severe switching surges.

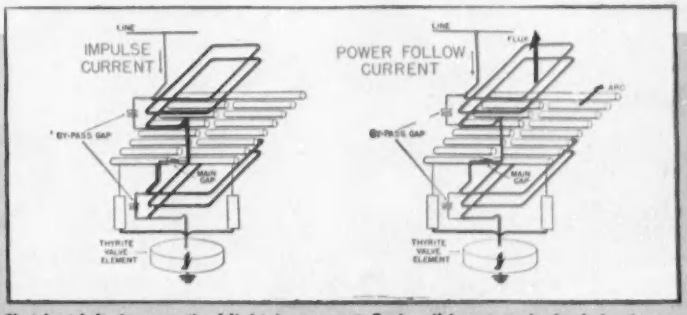
You get greater endurance now—and it protects you for future increasing discharge duty on station arresters attending trends to higher voltage lines, longer lines, greater lengths of cables, and more shunt capacitors, which increase the stored CE^2 energy in switching surges.

For more information about this new station arrester, get in touch with your nearest G-E Apparatus Sales Office or write for Bulletin GEA-1304 to Section 432-5, General Electric Company, Schenectady 5, N. Y.

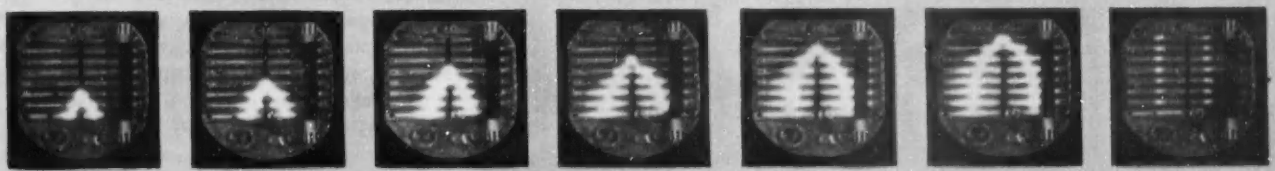
GENERAL ELECTRIC



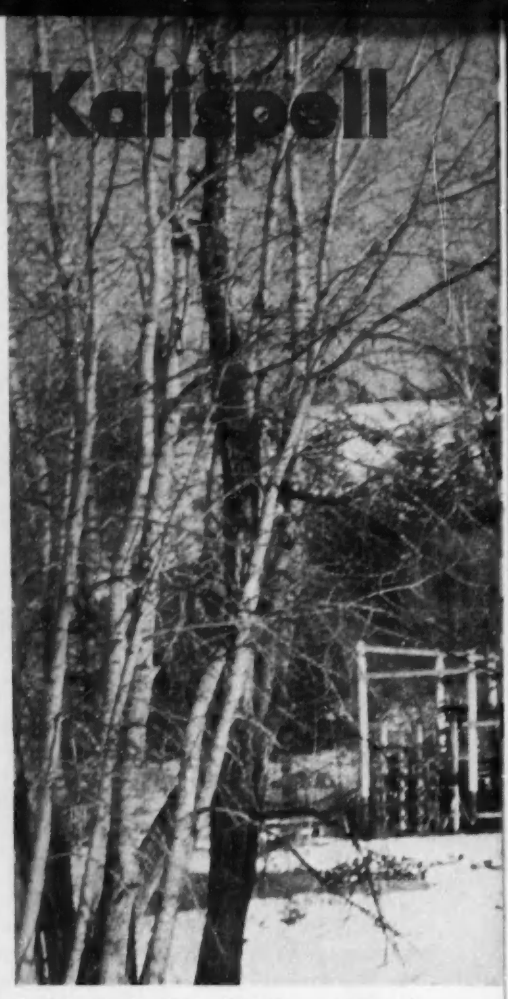
Cut-away view of new arrester showing new gap units and their components. Gap unit (circled in red) consists of 7 pairs of adjacent gap electrodes within the field of 2 magnetic coils. One pair of electrodes constitutes main gap which controls impulse sparkover sensitivity; other pairs of electrodes form multigap path for arc-interruption of the power follow-current.



Sketch at left shows path of lightning current. Each coil has a pre-ionized shunt gap that by-passes lightning current to the discharge path shown in red. Sketch at right shows path of 60-cycle power follow-current. After lightning sparkover, the 60-cycle power follow-current flows through the coils, as shown in red, creating magnetic flux. Arrows indicate direction of magnetic flux and blowout motion of arc, which motion is the same for either polarity of the 60-cycle follow-current wave.



Film strip (from high-speed movies) shows how magnetic force sweeps power follow-current arc progressively from main gap (see extreme left) to as many as 14 multigaps in series (see second from extreme right) for efficient arc-interruption in less than a half cycle. The arc-path moves so rapidly that even hundreds of interrupting operations cause no harmful scarring or burning of gap electrodes.



At left, Pacific P&L's Yale Dam stands under

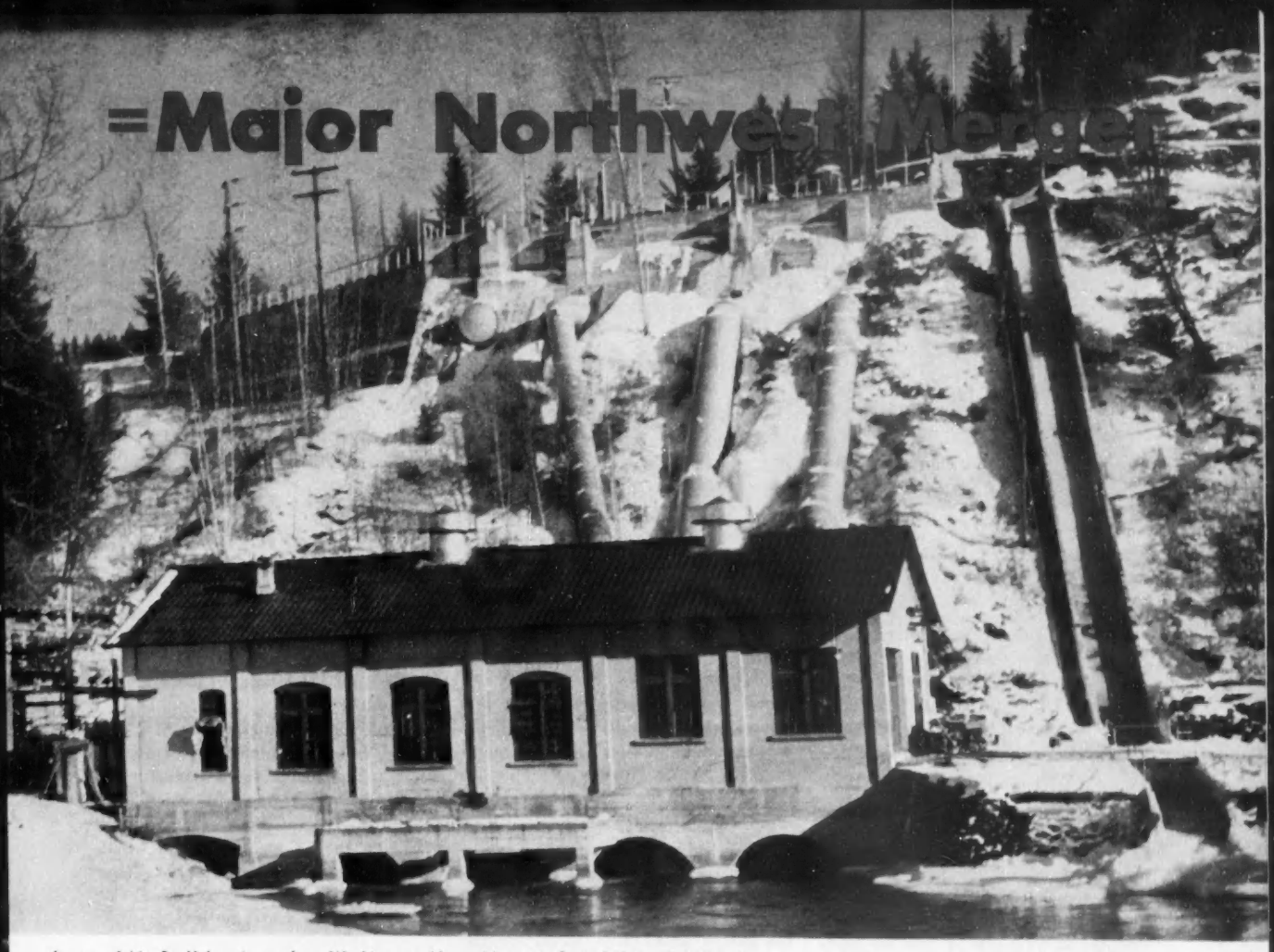
• A bigger Pacific Power &

There's merger in the wind in the Pacific Northwest. Big one. Between Pacific Power & Light Co and Mountain States Power Co. PP&L's Pres Paul B. McKee and MSP's Chairman Z. E. Merrill announced plans for exchange of common and preferred stock with Pacific to emerge as the survivor (EW, Jan. 18, p 5). Pacific's 20,000 stockholders and Mountain States' 7,000 will be asked to endorse the plan at special meetings March 12. Then it's up to state and federal regulatory bodies.

The bigger Pacific P&L would pool 283,000 customers of electric, telephone, water and steam heating utilities in five states. Last year the two companies earned total revenues of $37,556,000. Pacific is capitalized at $108 million and Mountain States at $44 million.

McKee and Merrill issued a joint

=Major Northwest Merger



the eye of Mt. St. Helens in southern Washington. Above, Mountain States' Kalispell hydro plant serves a company area in western Montana

Light would emerge from proposed combination with Mountain States Power

statement on the merger: "Consolidation of the two operating utilities greatly strengthens the ability of the companies to meet present and future public service requirements of their customers and to support the development of the region.

And A. W. Trimble, president of Mountain States put it this way:

"The move will put us in a position to be able to develop the power requirements of our customers as needs require and relieve us from almost total dependence on the federal government for additional power supply."

In Twin-Dam Plan . . . Trimble's reference to development of power supply recalls that both companies are parties to a five-company proposal to build two large hydroelectric dams on the Clearwater River (Penny Cliffs and Bruces Eddy) in Idaho as part of the Eisenhower Administration's "partnership" program between private and public power in the region.

Under the merger agreement, Merrill would hold the position of chairman of the board of the new firm and McKee would continue as president. Trimble becomes a vice president.

The two systems are not directly interconnected at present, but 59% of MSP's gross revenues originate in Oregon service as does a major share of Pacific's gross. A connection between MSP's Willamette valley division, that company's largest, and Pacific hydro generation capability is considered logical. Pacific has steam plants for peaking and emergency in Portland and steam plant and service in Astoria at the mouth of the Columbia river and north of MSP's isolated area in neighboring Tillamook county on the Pacific shores.

It was only four years ago that the PP&L top executive defied American Power & Light Co's Howard L. Aller during Securities & Exchange Commission hearings on Aller's plan to sell 500,000 shares of PP&L common as required by the Holding Company Act. Aller wanted SEC to waive requirements that the stock must be sold by competitive bidding.

Portland utility executives contended the deal involved plans of associates of Guy C. Myers, who has handled purchases for public agencies, to carve up Pacific for sale to a dozen or more Washington and Oregon PUD's. But PP&L was able to shuck off its holding company, and McKee and his staff are still at the helm.

Earlier Merger . . . Three years earlier, American Power & Light had affected the merger of PP&L, which operates

BOARD CHAIRMAN of the new Pacific P&L would be Z. E. Merrill, who holds that post at Mountain States Power

PRESIDENT would be Paul B. McKee, who holds the post now. Pres A. W. Trimble of Mountain States would become a vice president

in both Washington and Oregon, with Northwestern Electric Co, which operated electric and steam service in Portland, Ore., and vicinity and electric service in and around Vancouver, Wash. American owned all common stock of both companies and in April, 1947, the FPC approved the merger.

Pacific was formed in June, 1910 by consolidation of four operating utilities in the lower Columbia valley.

The newly formed company began expanding and integrating its system and in the mid-'20's it became associated with Northwestern Electric, whose common stock American also had acquired.

Today system peaking capability is 303,000 kw. During the 12 months ending July, 1953, the company had purchased 61% of its requirements from the Northwest Power Pool. But with new 108,000 kw Yale Dam in full operation during heavy runoff of the Lewis in December, Pacific was temporarily supplying its own needs and delivering surplus to the regional pool. It figures Yale will save $1.6 million annually on purchased power.

Power Revenue . . . Electric service income included $7,682,950 from 102,779 residential customers who used 572,803,000 kwhr for a customer average of 5,646 kwhr annually at a rate of 1.34¢ per kwhr. The total 152,761 electric customers purchased 1,678,360,000 kwhr. Electric revenues for 12 months ended November, 1953 included $20,742,118 for electric service, which included $268,169 abnormal steam costs surcharged to customers by order of the PUC.

Other Half of the Merger

Mountain States Power Co operates electric, telephone, water and steam heat utility services in over one hundred communities and rural areas of four Pacific Northwest states, an assorted package of 131,145 customers as of July 31, 1953.

Since 1944 operating revenues have increased 212% to total $15,752,325. In the past five years use of electricity among 91,878 residential customers has gained about 50% to an average 4,500 kwhr.

Load and customer diversity is a valued characteristic of the widely scattered five MSP operating divisions, each with several or all of the various departments functioning. The Oregon operations, which produce 63% of gross revenue, are concentrated in the Willamette Valley.

Electric service represents about 94% of the annual gross from all divisions, and, as of July '53, went to 111,643 customers.

The total electric service income during that period was $14,819,446. The average annual residence use was 4,478 kwhr in this period of an average price per kwhr of 1.85¢ and an average annual billing total of $82.63. These cost-billing averages were off normal, however, because of amounts added in Oregon to recoup the controversial abnormal steam generation cost of December 1952 through May 1953. The average per kwhr charge in 1951 was 1.81¢.

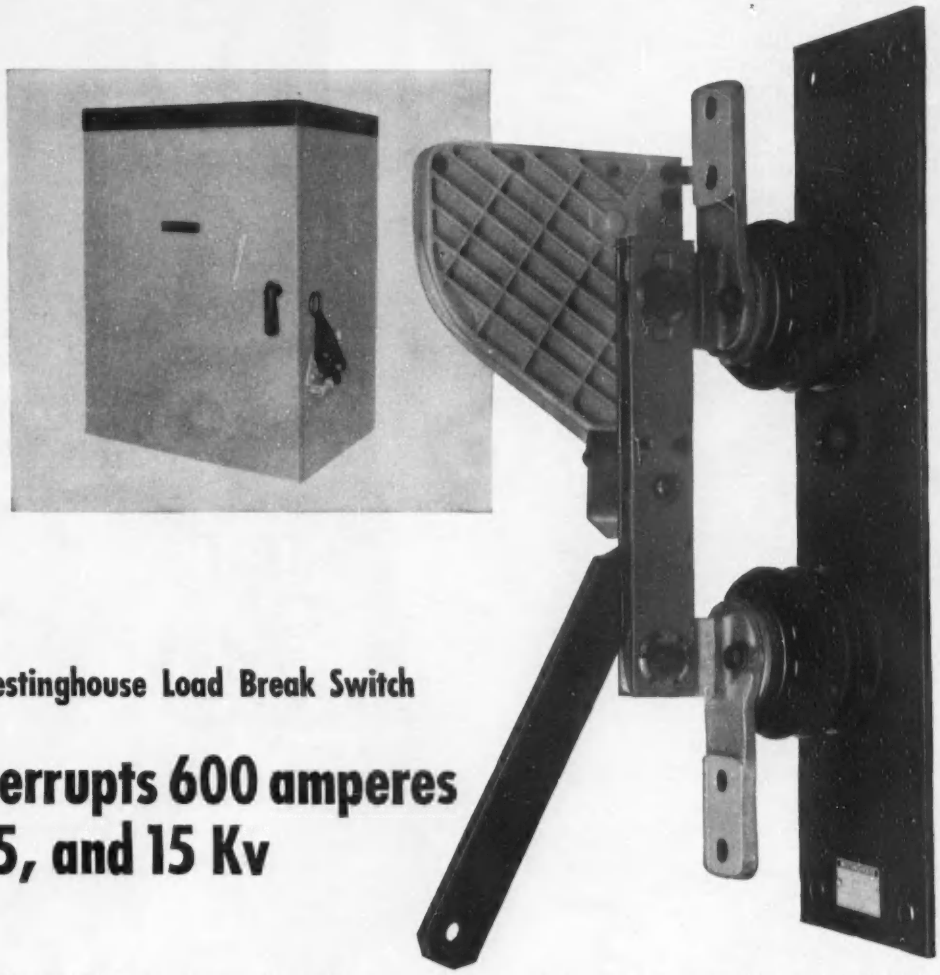
MSP's five divisions are not interconnected, but those in Oregon are expected to be tied into PP&L's system in the future. The others will remain interconnected with neighboring private or federal systems which supply power.

The company purchases most of its power from pools in the Northwest. Its plants have a rated capacity of 43,674 kw, the largest of which is a 15,000 kw steam plant at Coos Bay, Ore. Of the 15 plants, ten are small and have total rating of 6,964. The largest hydro plant is at Big Fork, Mont., rated at 4,150 kw.

Age: 37 . . . The company was organized in 1917, when Standard Gas & Electric Co system was being put together, and underwent reorganization in 1938 to emerge independent of the holding company.

Mountain States faces public agency competition in its Willamette division in Oregon. City of Springfield built competing system in 1950, but last year MSP was serving 60% of the customers. In Tillamook county a PUD has lured away over 1,000 customers. A third situation involves condemnation suit by the Eugene Water & Electric Board to acquire two neighboring districts in Lane county. In mid-1953 the city system started building duplicate system and in December filed suit offering $1,350,000 for facilities serving about 2,200 MSP customers.

Industry observers look on the merger as a foregone conclusion. From the look of things, Pacific P&L, the successor-to-be, has weathered all the storms aimed at its dissolution and wound up in a stronger competitive position than before cold winds blew.



Improved Westinghouse Load Break Switch

Now interrupts 600 amperes at 5, 7.5, and 15 Kv

More interrupting ability—The Westinghouse line of Type LCB indoor interrupter switches has been redesigned to boost the interrupting ratings. The new design raises the rating to 600 amperes at 5, 7.5 and 15 kv. This rating applies when the switch is used as a NEMA Class B device guaranteed to operate 100 times without maintenance or repair of any kind. As a NEMA Class A device guaranteed for 500 operations, the switch will interrupt 600 amperes at 5 kv or less, 200 amperes at 7.5 kv and 100 amperes at 15 kv.

Uses De-ion® arc-quenching principle—The load-interrupting ability of the Westinghouse Type LCB switches is provided by the De-ion action. When the switch is closed, practically all of the current flows through a main blade. As the contact on the main blade starts to open, current is transferred momentarily to a quick-break blade which is inside an arc chute. When the quick-break blade is snapped open at high speed, the heat of the arc releases a blast of de-ionizing gas from the gas-generating lining of the arc chamber. This combination of quick-break and De-ion action quickly extinguishes the arc and the complete circuit is safely disconnected.

Self-cleaning contact surfaces—The contact area on each switch blade has several fine parallel ridges or teeth of solid silver. When the switch is closed, these knife-edge teeth bite into the opposite jaw block and form a highly efficient electrical contact. Opening and closing the switch forces any dirt that may occur into the spaces between the teeth, keeping the contact surfaces clean and eliminating maintenance.

Several ratings—Type LCB switches are available in several ratings from 2.5 to 23 kv, open or enclosed, single or double-throw. For more information, write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania, for a copy of Descriptive Bulletin 36-117. J-60851

YOU CAN BE **SURE**... IF IT'S

Westinghouse

Meeting the Nation's Growing Power Load

Westinghouse Magamp . . . new answer to more effective generator voltage regulation

The new Westinghouse Magamp Regulator and Excitation System provides Utilities a more reliable means of regulation for synchronous machines. As used with a self-excited exciter, the Magamp system has a faster response and requires little or no maintenance.

There are no moving parts in the regulating and limiting components—nothing to wear out. An additional contribution to reduced maintenance is the fact that the power supply in the Magamp system is a motor-driven, a-c generator having a permanent magnet field—it has no slip rings, no commutator, no brushes.

The Magamp system provides more effective regulation of voltage than that obtainable with previous types of rotating amplifier regulators. Further, it can be successfully applied to any size, speed or type of a-c synchronous machine; that is, it is equally applicable to the excitation systems for turbine generators, water-wheel generators and synchronous condensers.

The development of Westinghouse Magamp is one more example of thinking ahead for tomorrow's peak loads—and improved equipment design and operation to meet them. Translated into Utility management objectives—investment in equipment is kept in proper proportion, as systems expand to satisfy America's constantly increasing demands.

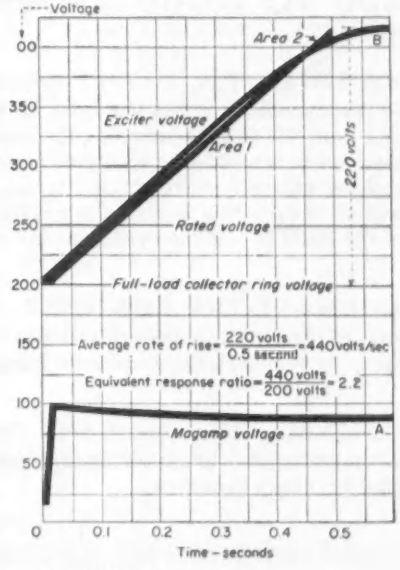
YOU CAN BE SURE...IF IT'S

Westinghouse

Response ratio test demonstrates Magamp capability

In order to demonstrate the capability of the new regulator and excitation system, a 420-cycle Westinghouse Magamp System was tested in conjunction with a 50,000-kw, 3,600-rpm turbine generator. A 215-kw, direct-connected exciter was used. The extremely fast response of the Magamps is illustrated by curve A of the chart below. This shows that the power Magamp reaches ceiling voltage in approximately 0.02 second or 1.2 cycles on a 60-cycle basis. The output voltage of the main exciter, curve B, reaches its maximum magnitude of 420 volts, or 168 percent of rated exciter volts, in approximately 0.6 second. If the equal-area criterion of determining exciter response ratio is applied to this curve, that is, making area 1 equal area 2, the equivalent response ratio of the excitation system is 2.2.

Such equivalent response ratios are not required for the usual application, but the test shows the capability of the Magamp. The desirable response ratio of the exciter is dictated by system stability considerations.



Ready for installation

All components of the Westinghouse Magamp Regulator and Excitation System are assembled in a standard, low-voltage, metal-enclosed switchgear cubicle adjacent to the exciter field rheostat and field breaker cubicles. The entire assembly is completely factory adjusted and tested—shipped ready for installation.

Further details on the new Westinghouse Magamp can be supplied by your nearby Westinghouse Representative—or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

The Standard of Comparison!

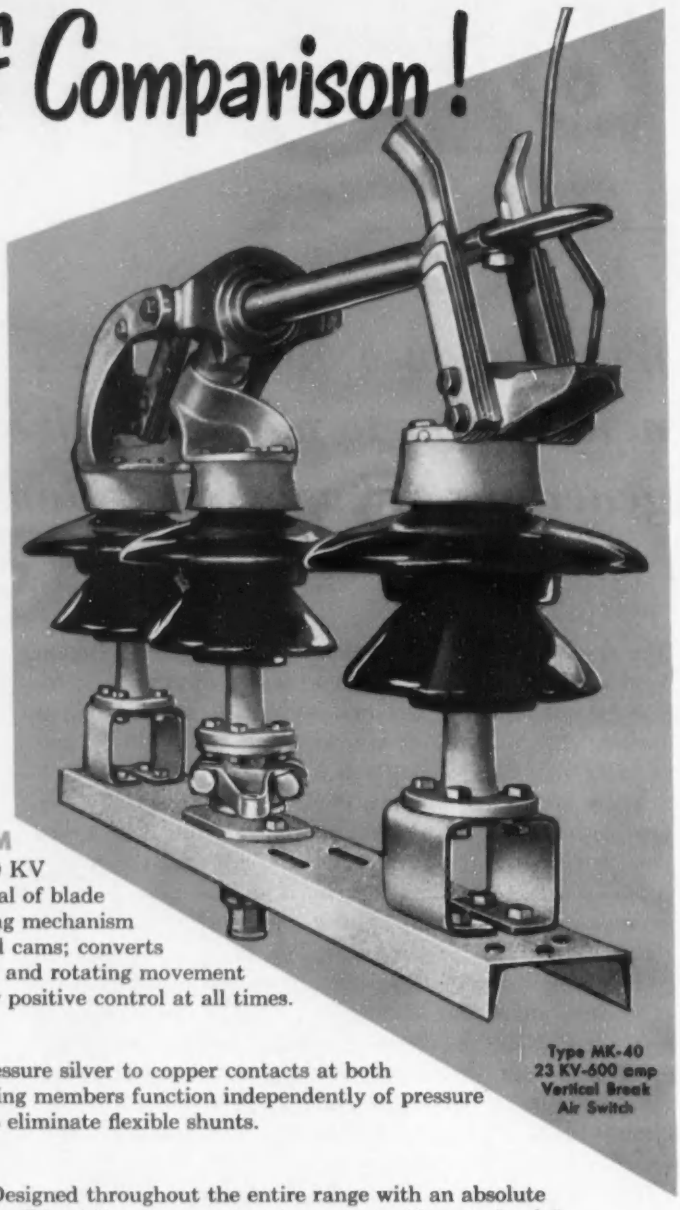
DELTA-STAR'S

MK-40

Outdoor Vertical Break SWITCHES

7.5 KV TO 330 KV

400 TO 5,000 AMPERES



Type MK-40
23 KV-600 amp
Vertical Break
Air Switch

COMPARE THE BLADE MECHANISM—Throughout the entire line from 7.5 KV to 330 KV and from 400 to 5,000 amperes, the same principal of blade mechanism is used. One 45-degree blade actuating mechanism replaces arrangements of cranks, levers, links and cams; converts motion of operating insulator to a vertical lifting and rotating movement of the blade in just the right sequence and under positive control at all times.

COMPARE THE CONTACTS— High pressure silver to copper contacts at both ends of the floating tubular blade. Current carrying members function independently of pressure applying members, the simple and logical way to eliminate flexible shunts.

COMPARE THE CURRENT PATH— Designed throughout the entire range with an absolute minimum number of current interchange surfaces. Direct line from contact to contact. All parts in plain view for visual inspection.

COMPARE THE TEST RESULTS -No design of Delta-Star Switches has ever been put into production on a calculated basis only. Complete laboratory tests are checked in the field under actual service conditions.

Ask for Publication 5212

WHEN YOU WANT THE BEST IN HIGH VOLTAGE SWITCHING EQUIPMENT SPECIFY DELTA-STAR

DELTA-STAR ELECTRIC DIVISION

H. K. PORTER COMPANY, INC.
OF PITTSBURGH
2437 FULTON STREET, CHICAGO 12, ILLINOIS
DISTRICT OFFICES IN PRINCIPAL CITIES

NEWS ABOUT PEOPLE

McNealey Is Appointed a VP

Columbus & Southern Ohio Electric veteran becomes operations vice president to succeed M. L. Evans, who retires Feb. 28

J. LAWRENCE McNEALEY

J. Lawrence McNealey has been named vice president in charge of operations of Columbus & Southern Ohio Electric Co to succeed Morgan L. Evans, who has resigned after 47 years' service with the company and its corporate predecessors. Evans' retirement becomes effective Feb. 28.

McNealey, who has served as assistant to Evans for more than three years, entered company service in 1923 as a meter reader while still in high school. Following technical training at Case Institute of Technology, he worked for the utility as a lineman, line superintendent, and electrical engineer. In 1936 he took on additional duties as safety director in its Southern district, going in 1941 to Columbus as assistant purchasing agent.

Prior to becoming assistant vice president in 1950, he served as assistant manager of the Southern district for four years.

Evans' career with the company started in 1906 as a clerk with Columbus Railway & Light Co, a predecessor. He was made general superintendent in 1929, and vice president of operations in 1930.

Hummel Named Executive VP

C. A. HUMMEL

C. A. Hummel, vice president of Interstate Power Co, has been named executive vice president of the utility. His promotion fills the vacancy made last summer when M. L. Kapp was elected to the presidency of the Iowa utility.

Hummel has been with Interstate Power and sister companies for 28 years. Following his graduation from the University of Minnesota in 1926, he started working in the drafting department of the utility's general office at Dubuque, Iowa. He served Interstate Power as construction engineer and field engineer before moving in 1931 to Tulsa, where he served Central States Power & Light Corp as a district engineer and later as the company's chief engineer.

He rejoined Interstate Power at Dubuque in 1939 as chief engineer. He was elected a member of the utility's board of directors in 1939 and was elected to the post of vice president in 1949.

H. P. WHITEHEAD

Whitehead Promoted by Georgia Power Co

H. P. Whitehead, assistant operating manager of Georgia Power Co, has been promoted to operating manager.

Whitehead's successor as assistant operating manager is A. H. Wade, superintendent of system operation. R. J. Cooper, protection engineer, assumes the duties relinquished by Wade.

Since joining Georgia Power in 1929, Whitehead has served in various capacities, including supervisor of special construction and assistant division superintendent of the Atlanta Division. Prior to his association with the utility he was affiliated with Westinghouse Electric Corp.

4 Executive VP's Elected

Radio Corp of America has announced the elevation of four vice presidents to executive vice presidents, creation of two new divisions, and a consolidation of staff functions for the entire corporation. New executive vice presidents are Joseph B. Elliott, who will be in charge of the new Consumer Products Division; W. Walter Watts, in charge of the new Electronic Products Division; Dr Elmer W. Engstrom, in charge of RCA Laboratories Division; and Charles M. Odorizzi, in charge of a newly consolidated corporate staff serving all RCA units and subsidiary companies.

GLENN MITCHELL

Southern States Elects Mitchell Vice President

Southern States Equipment Corp, Hampton, Ga., has announced the following organizational changes:

Glenn Mitchell was elected vice president for manufacturing. Mitchell, formerly production manager, is now in charge of all manufacturing activities, including the stores department and maintenance of all plant properties.

T. A. Burdeshaw, formerly sales manager for the Electrical Division, was promoted to the position of engineering manager, assuming full responsibility for all engineering activities of the company.

J. E. Cordell was promoted from assistant sales manager to sales manager of the Electrical Division to assume the responsibilities and duties formerly held by Burdeshaw.

•

Duncan C. Kennedy, assistant manager of the Lynchburg (Va.) district of Appalachian Electric Power Co, has been promoted to acting manager of that district to replace the late G. Roberts Neubauer (EW, Jan. 4, p 38). A 21-year veteran of AEPCo, he was made assistant manager in 1945.

Nelson I. Bass, superintendent of Houston Lighting & Power Co's Western Division at Rosenberg, Tex., for the past 26 years, has been made division manager of the company's Baytown (Tex) plant. Bass replaces **W. C. Swain,** who has retired after serving as division manager there since 1925.

G. U. Cusack has been appointed superintendent of the Pueblo line department of Southern Colorado Power Co to succeed **E. B. Hornbacker,** who has retired. Cusack's former position as assistant superintendent of the department has been filled by **A. J. Martin.**

J. E. Veres has been named sales manager of Penn Electrical Co, Irwin, Pa. He takes over the duties previously held by **Vice Pres F. H. Ferris, Jr,** who has assumed responsibility for engineering and production at the company's Irwin Plant.

C. J. Moore, W. E. Nyce, and **L. E. Wells** have been promoted by Electric Storage Battery Co's Industrial Products Division. Moore, former manager of railway and motive power sales, was made industrial products sales manager. Nyce was appointed manufacturing manager, industrial products, and Wells, former chief engineer, was named director of research and engineering, industrial products.

FRANK X. LAMB

Lamb, Gilbert Elevated by Weston Electrical

Appointments of Frank X. Lamb as a vice president and Roswell W. Gilbert as assistant to the president have been announced by Weston Electrical Instrument Corp, Newark, N. J.

Lamb, who joined the company in 1921, will retain his former title of chief engineer in addition to taking on additional responsibilities in supervision of mechanical and electrical engineering activities.

Gilbert, in addition to his new post, will continue to serve as director of research. He joined Weston in 1934.

Both Weston executives are members of the American Institute of Electrical Engineers and Institute of Radio Engineers.

•

Emmett Johnson has resigned as superintendent of Oconto Falls (Wis.) Water and Light Commission after holding the post for 45 years.

L. F. Chambers, vice president and treasurer of Northern States Power Co, has been appointed principal finance officer of the utility.

G. I. Page, superintendent of operations and construction for Public Service Co of Oklahoma, has been elected a member of the utility's board of directors. He has been with Public Service for 27 years.

OBITUARY

S. Murray Jones, 52, assistant to the president of Boston Edison Co, died recently at Newton, Mass. After joining Boston Edison in 1945, he served successively as power sales manager, and director of rate administration and research, becoming assistant to the president last November. Following his graduation from Massachusetts Institute of Technology in 1921, he did engineering work with Alabama Power Co and Carolina Power & Light Co. During World War II he was an assistant to Dr Vannevar Bush in the Office of Scientific Research and Development.

John R. Farmer, 55, comptroller of Central Hudson Gas & Electric Corp, died Jan. 28 at Poughkeepsie, N. Y. He had been with Central Hudson for the past 34 years.

Mitchell C. Thorn, 51, newly named assistant general manager for Pacific Power & Light Co, died recently. Thorn, who had not assumed his new post, formerly was district manager at The Dalles, Ore., a position he took over in 1949. He joined Pacific P&L in 1921.

Martin L. Sloan, 66, former vice president of General Electric Co with headquarters at Nela Park, Cleveland, died Jan. 27 at Los Altos, Calif. Sloan, who was named vice president and general manager of GE's Lamp Division in 1945, retired in 1949 after nearly 40 years' service.

Here's Proof of Performance...

These Creosoted poles are still in service 25 years after installation

• Located near Pontiac, Mich., a four-mile sub-transmission line of Detroit Edison Company offers excellent testimony of Creosote's effectiveness as a wood preservative.

In 1929, 141 Creosoted poles were installed in this section. To date, 23 poles have been replaced . . . 22 of them due to road widening, lightning damage, vehicle accidents, and the like. Only one was lost to wood's natural enemies.

What's more, Detroit Edison reports that maintenance costs on these poles treated with Creosote are negligible. An official remarks, "They require nothing more than periodic checking—a big factor when maintenance costs can be a big chunk of operating expenses."

Thanks to service records like this—established in nearly a century of use—you *know* you can depend on Creosote as a wood preservative.

And you have extra assurance when U·S·S Creosote is used, for it is a uniform product made to give you uniformly good results. For complete information, contact our nearest Coal Chemical Sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

HERE are some of the Creosoted poles in Detroit Edison's sub-transmission line near Pontiac, Mich. Three-fourths of the poles in the Detroit Edison system are protected by Creosote.

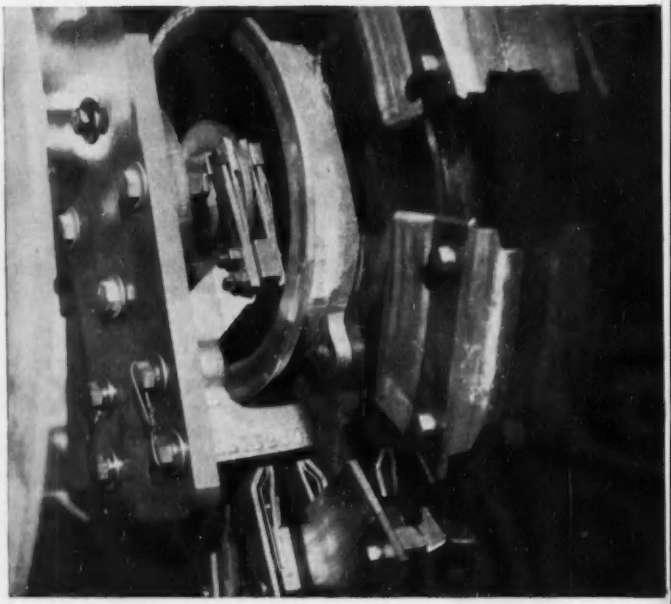
U·S·S CREOSOTE

USS

UNITED STATES STEEL

Practically after Operating

PHOTOS TAKEN AFTER 1,240,000 OPERATIONS



The unretouched pictures at right show the condition of contacts and mechanism disassembled from a 17-year-old regulator of a western utility. After 1,240,000 tap changes under load, neither mechanism nor contacts of this power regulator show appreciable sign of wear.

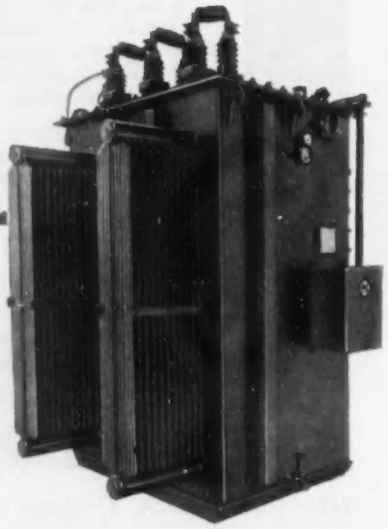
The regulator was disassembled when it was found necessary to replace deteriorating gaskets installed when the regulator was built in 1937. After thorough inspection the unit was placed back in service.

Field and Laboratory Proof

This operating record offers field proof in addition to laboratory tests that have proved you get years of practically trouble-free operation from Allis-Chalmers 5/8% step regulators.

You get the reliability and rugged construction of the *Quick-Break* mechanism on all Allis-Chalmers 5/8% step voltage regulators as well as on transformers equipped with tap changing under load. Performance records like this one — in thousands of applications — are convincing proof that it pays to have Allis-Chalmers tap-changing equipment on your system.

A-4244



Designed Features Add to Service Life

There are four reasons why you get such an excellent service record from Allis-Chalmers regulators. (1) Contacts are large. (2) They are manufactured from arc-resisting materials. (3) The small 5/8% steps reduce the amount of kva to be interrupted. And (4), perhaps most important, famous *Quick-Break* mechanism provides fast, clean contact separation, snapping the moving contacts from one position to the next before there is time for damage to occur.

In addition, with all Allis-Chalmers 5/8% step regulators you get advantages like unit construction, *Feather-Touch* control, and twenty years of experience with 5/8% step equipment. Get the complete story from your nearby Allis-Chalmers district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

No Wear for 17 Years

ALLIS-CHALMERS

Originators of 5/8% Step Regulators

150-Mva Lines

HOWARD P. SEELYE, Manager of Engineering, Detroit Edison Co, Detroit, Mich.

For nearly six months electric energy has been flowing across the largest international interconnection in the world. The interconnection is made up of two 150-Mva lines. Both link the 2.2 million-kw Detroit Edison Co system with the 3.5 million-kw system of Canada's Hydro-Electric Power Commission of Ontario.

The intertie is unusual in several ways. First, it could not be built until special legislation was passed in both countries. Second, it was constructed for the purpose of day-to-day mutual assistance and economy rather than to serve a specific customer or to bring in power from a specific source. Third, it was constructed across one of the heaviest traveled water ways in the world without delaying that traffic.

Legislation . . . Detroit Edison, with all its facilities in Michigan and under Michigan Public Service Commission regulation, has not been classed as a "public utility" within the meaning of Section 201 (c) of the Federal Power Act. Hence it has not been subject to regulation as such by the Federal Power Commission.

That commission's Rule 03.27, however, provided that: "The ownership or operation of facilities for the transmission of electric energy from a point within a state to a foreign country makes one a 'public utility' under the Federal Power Act, even though the portion of such facilities in this country is located wholly within such state." This rule was believed to be in conflict with the intent of Section 201 (c) of the Federal Power Act.

In order to clarify this matter, a new Section 202 (f) to the Federal Power Act was passed by Congress and became a law on Aug. 7, 1953. This section provides

Delray Intertie Linking . . . Detroit with Windsor, Ont . . .

	U. S. Side		Canadian Side	
	Anchor Tower	Crossing Tower	Anchor Tower	Crossing Tower
Total Height—ft	200	302	302	174
Arm Height—ft	180	287	287	154
Base Size—ft & in.	51-5	43-5	43-5	45-0
Post Angle—in.	8x8x1	8x8x½	8x8x½	8x8x1
Weight—Tons	40	44	44	35
Sag (120F)	Conductors 105 ft, 8 in.; Ground wires 86 ft, 3 in.			
Clearance	Over low water datum 182 ft, 7 in.			
Span	Between the anchor tower and crossing tower on U. S. side, 598 ft			
	Between the crossing towers, 2,387 ft			
	Between the crossing tower and anchor tower on Canadian side, 1,110 ft			

Link Detroit Edison-Ontario Hydro

that the ownership or operation of facilities for the transmission of electric energy across an international boundary, which is not thereafter transmitted into any other state, shall not make a person a public utility subject to regulation under other provisions of the act. The authority of the FPC over the licensing of exported electric energy under Section 202 (e) was in no way affected.

FPC rescinded its Rule 03.27 and granted the license.

In order to proceed with the interconnection, Detroit Edison had to secure some other approvals and permits:

1. From U.S. Army Engineers, a permit to make crossings over a nevigable stream.

2. From Civil Aeronautics Authority, approval of the location, height, and lighting of towers.

3. From the President of the United States under Executive Order 8202 and through the FPC, a permit to make physical connection with a foreign country.

4. From Michigan PSC, approval of project and contract.

Ontario Hydro had to secure similar permits from Canadian authorities.

Mutual Assistance Aim of Tie . . . Because of the nature of their systems and operations, both Detroit Edison and Ontario Hydro stand to profit by the tie. American utility, supported by 1.9 million kw of other Michigan capacity, is a steam system. The Canadian system is 80% hydro. It frequently has large amounts of off-peak power which Detroit Edison can use and thus save fuel at its own plants. When water is low, Ontario Hydro can get power from Detroit Edison in off-peak hours and save water for generation at peak hours. This has been the case most of the time since the tie was activated, but a reverse flow of power is expected soon.

The contract between the utilities is based on mutual help in emergencies and exchange of available surplus energy for economy. There is no firm power obligation.

The rate structure is simple. There is a flat kilowatt-hour rate for "scheduled" energy to supply a deficiency of either kilowatts or kilowatt hours. There is also a sharing of savings on "displacement" kilowatt hours delivered to take the place of a similar amount of high-cost generation. Administration of the contract is in the hands of a small administrative committee and a scheduling committee.

uses these conductors

	Conductors 636 MCM ACSR	Ground Wires 7/16-in. EHS Steel
Copper Equivalent	400MCM	
Stranding	19 Steel 30 Alum	7 Steel
Diameter—in.	1.019	0.435
Weight per foot—lb	0.986	0.399
With ½-in. ice—lb	1.931	0.981
Breaking strength—lb	31,500	20,800
Design tension—lb	15,750	9,750
% of Ultimate	50.0	46.9
Stringing sag (60F)—ft	94.5	79.7
Tension—lb	7,540	3,600
% of Ultimate	23.9	17.3
Final sag (60F)—ft	100.4	82.1
Tension—lb	7,110	3,500
% of Ultimate	22.6	16.8

Two Ties 50 Miles Apart . . . Preliminary studies on a network analyzer indicated that 200 to 300-Mw interchange would be feasible. They also indicated that no serious problems of instability were likely.

For reliability it was decided to have two ties. One was to link the Delray Plant in Detroit and the J. Clark Keith Plant in Windsor, Ont. The other, 50 miles away, would link Detroit Edison's Marysville Plant with the Sarnia (Ont.) transformer station. Each tie was to have a 150-Mva rating equal to that of the regulating transformer installed in each to control the voltage and flow of kilovars between Detroit's 120-kv system and Hydro's 115-kv system.

The studies, later substantiated by actual operation, indicated that the phase shift between the two tie points was different on the two systems. This would cause a balanced interchange of energy (usually in at Detroit and out at Marysville) of the order of 35 to 40 Mw when both ties are closed, unless controlled by phase angle regulation. Although this limits the maximum interchange to something less than 300 Mva, it was decided not to install a phase regulator initially.

Both ties involved crossings over a major river—the Delray-Keith line over the Detroit, and the Marysville-Sarnia over the St. Clair. Overhead crossings were chosen as preferable to submarine cable from the standpoint of economy and of quicker replacement.

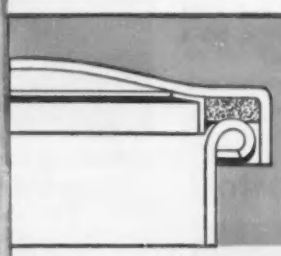
Biggest obstacle in erecting the lines was the river traffic. The rivers more properly are straits connecting Lake Huron with Lake Erie. This is the "highway" that carries the heavy iron ore traffic, one boat every 15 to 20 minutes. To install five wires at each crossing without interfering too much with traffic required careful planning, smooth execution, and the "breaks."

The same method was used at both crossings. One end of the wire was held at the anchor tower on the U.S. side and passed over blocks on the crossing tower. The reel was then placed on the stern of a tug which as it crossed the river payed out the wire to the bottom of the stream. On the Canadian side the remaining wire was unreeled and the end passed over blocks on the crossing tower. A tractor raised the wire to its approximate final position where it was anchored temporarily. After all five wires were installed, each was sagged and anchored. About 20 minutes were taken for getting each wire into position.

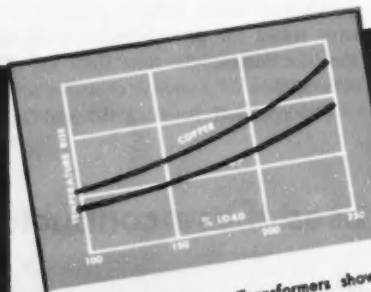
The five wires in the Delray-Keith crossing were installed in 8½ hours on one day, the five in the Marysville-Sarnia crossing in about five hours on another.

a Bear For

Tank base is pressed into tank shell and resistance seam welded. A sealing mastic compound is applied and the extending portion of the tank is rolled in to provide triple protection against mechanical abuse. Water or condensation cannot gather at this point to form rust and corrosion.



Moloney's newly developed tank seal offers all the desirable features for distribution transformer tank covers—completely retained by means of a welded-in retainer ring. Retainer serves as a stop for corprene gasket and a return for splashed oil. Gasket is stretched around retainer, not cemented. May be used time and time again. Corprene affords a positive seal, impervious to oil, gas and moisture.



Moloney HiperCore Transformers show to advantage when excessive overload conditions exist. The deteriorating effect of high winding insulation temperatures shortens the life of transformers. HiperCore Transformers maintain a lower hot-test-spot-over-oil temperature thus reducing the deteriorating effects such overload conditions impose on winding insulation.

M O L O N E Y

Manufacturers of Power Transformers • Distribution Transformers

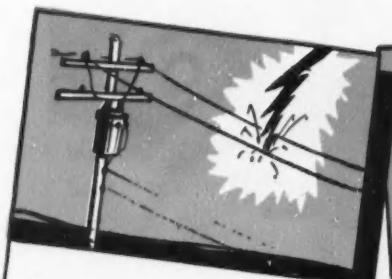
SALES OFFICES IN ALL PRINCIPAL CITIES

'OL BRUIN is built to take plenty of punishment . . . he can also hand it out. Rugged as he is tho', when the going gets too rough or Mother Nature gets mad, he retires to his cave and hibernates 'til things blow over.

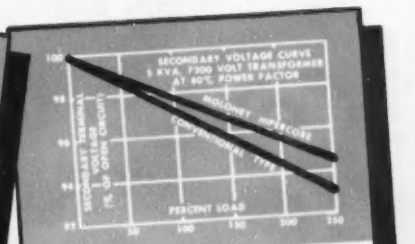
Punishment

Not so for Hi HiperCore! It's true that, like the bear, he can take punishment. But, unlike the bear, he has to stay put and take whatever comes along . . . bad weather . . . rough operating conditions . . . overloads, or what have you. You expect him to perform under all these varying conditions and to perform well. Of course you do, because Hi HiperCore's reputation has been built on performance . . . performance under all conditions . . . and here's why he delivers—

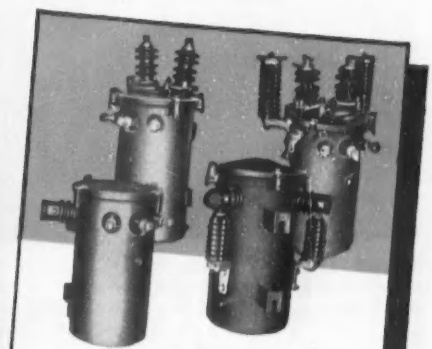
ME54-3



HiperCore Transformers, because of their "Surge-Proved" design, are highly resistant to the effects of switching and lightning surges. Exhaustive surge tests and years of design experience have enabled Moloney Engineers to develop a uniformly high insulation level throughout the entire HiperCore Transformer. Proved by years of successful operation.



Voltage Regulation is an ever-present operating problem. Peak load and off-peak load conditions must all be handled with minimum installed capacity. The smaller cores of HiperCore Transformers make possible windings having lower impedance. Lower impedance provides lower voltage drop at all loads. Improved voltage regulation is the result.



Moloney HiperCore Distribution Transformers are available in all standard ratings from 3 Kva up in both Conventional and CSP designs.

E L E C T R I C C O M P A N Y

Load Ratio Control Transformers • Step Voltage Regulators • Unit Substations • Electronic Transformers

FACTORIES AT ST. LOUIS, MO. AND TORONTO, ONT., CANADA

POWERS *American*

SERIES HD-1

"Pole-Master"

fully-powered HYDRAULIC DERRICK

- LIVE BOOM — CAN BE OPERATED UNDER LOAD
- INFINITE OPERATING POSITIONS
- REQUIRES ONLY SINGLE-DRUM WINCH
- LIFTS LOADS TO BODY PLATFORM
- NO CENTER LEG TO OBSTRUCT BODY CARGO AREA

"The Accepted Standard with Utilities Everywhere"

Operation of the Series HD-1 derrick is *completely hydraulic.* It is raised to working position, elevated or lowered to desired height, and returned to carrying position . . . hydraulically.

There is no mechanism to endanger workmen — no center leg to obstruct the body cargo area — no manual operation, other than insertion and removal of locking pins, and shifting of hydraulic control levers.

This is a *heavy-duty* derrick which will handle poles up to 55 ft. in length — under the most severe operating conditions.

Capacity, with head sheave 5′ to rear of body, is 6000 lbs. When extended to 14′, capacity is 2500 lbs.

Details and prices will be sent on request!

THIS IS A "Live Boom" DERRICK

There are no pre-determined "stops" to limit operation of the derrick. It can be spotted in an unlimited number of positions, and moved at any time — even while supporting a full load.

Twin hydraulic rams raise the derrick from carrying position to working position in less than a minute. When derrick is spotted, a poppet-type control valve seals oil in cylinders to prevent "kick back" or "creeping".

POWERS-AMERICAN DIVISION

McCABE-POWERS AUTO BODY COMPANY

5900 NO. BROADWAY • ST. LOUIS 15, MO.
428 LATHAM SQ. BLDG. • OAKLAND 12, CALIF.

HEAT TREATING PANEL of experts suggest solutions to problems posed from floor. Left to right are panel moderator, Cary Stevenson, V P, Lindberg Engineering Co; E. E. Staples, V P, Hevi Duty Electric Co; W. E. Benninghoff, V P, Ohio Crankshaft Co; John Graham, chief metallurgist, International Harvester Co; Walter Holcroft, V P, Holcroft & Co; and L. B. Rosseau, V P, Ajax Electric Co

Conference Covers Industrial Heating

Benefit of better cooperation and coordination between utilities, heating specialists, and manufacturers is stressed. IEC Electric Heating School is demonstrated to 220 conferees

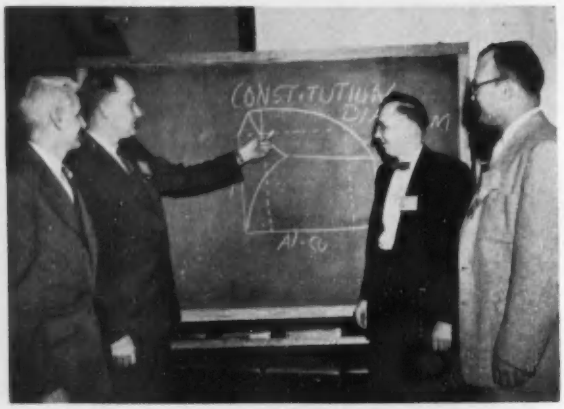
IEC CHAIRMEN—Maxwell Cole, Philadelphia Electric Co, Planning Committee, George E. Duerr, West Penn Power Co, Electric Heating Committee and J. Reed Hartman, vice president, Cincinnati Gas & Electric Co, Executive Committee

ELECTRIC HEATING SCHOOL demonstration by W. F. Frick, West Penn Power Co included many samples of metal sheath heaters. Special 6-day course will be available shortly in kit form with leader's guide, slides and 50 student texts

The benefit of better cooperation and coordination between utility power sales engineers and industrial heating specialists and electric heating equipment manufacturers was a recurring theme at the National Industrial Electric Heating Conference, Jan. 18-22, at Cincinnati.

The conference, sponsored by the Industrial Electrification Council, brought together 220 utility power sales and industrial heating engineers and representatives of industrial electric heating equipment manufacturers. They attended sessions at which more than 50 of the most experienced men from both utilities and manufacturers covered the theory and applications of all phases of industrial electric heating. The sessions were augmented by

CATALYTIC REACTOR for recovery of heat is explained by Paul H. Goodell (center) Catalytic Combustion Corp, to Wm. Black, Jr, Ohio Power Co (left) and J. D. Farmer, Mich. & Ind. Electric Co



CONSTITUTION DIAGRAM is described by C. E. Peck, Westinghouse, (second from left) to N. K. Kobel, Lindberg Eng. Co, B. E. McArthur, Magnethermic Corp, and L. H. Gillette, Westinghouse

numerous case histories of actual installations as well as round table and floor discussion.

Highlight of the conference was a demonstration by C. H. Hartwig and W. F. Frick, West Penn Power Co, of the IEC Electric Heating School designed to educate plant engineers and electricians as well as industrial design engineers to make the simpler installations without outside help. George E. Duerr, West Penn Power and IEC Electric Heating Committee chairman, pointed out that this course covers the basic principles of industrial electric heat with detailed material on metal sheath heaters. It will be available to utilities in kit form complete with leader's guide, slides, and 50 students' texts.

If utility and manufacturers' heating engineers can get the acceptance for electric heating that it deserves through a good selling job, there can be no question of a bright and prosperous future for it, said J. H. Jewell, vice president of Westinghouse Electric Corp. He urged the group to go home and work, educate, promote, and sell the things discussed and described at the conference.

George E. Whitwell, vice president, Philadelphia Electric Co, emphasized the misconception that electricity is a too-expensive fuel. He said that the customer isn't buying a fuel. He's producing a product in a competitive market, and over-all results are what count—not just one item of cost.

According to C. L. Ipsen, vice president, Industrial Furnace Manufacturers Association, Inc, we are on the frontier of a revolutionary industrial heating development —the sintering of powdered metal. He pointed out that the cost and technical problems limit this process at the moment, but it is already successful for many small parts where the machine costs are high in proportion to the metal used.

There is prevalent in the U. S. Steel foundry industry, a feeling that large castings produced from electric furnaces are not so good as those produced from the open hearth, according to W. B. Wallis, president, Pittsburgh Electromelt Furnace Corp. In pointing out this fallacy, he said that in Canada, the Dominion Foundries & Steel Co has for years been producing better castings from two 75-ton electric furnaces than from their open hearths.

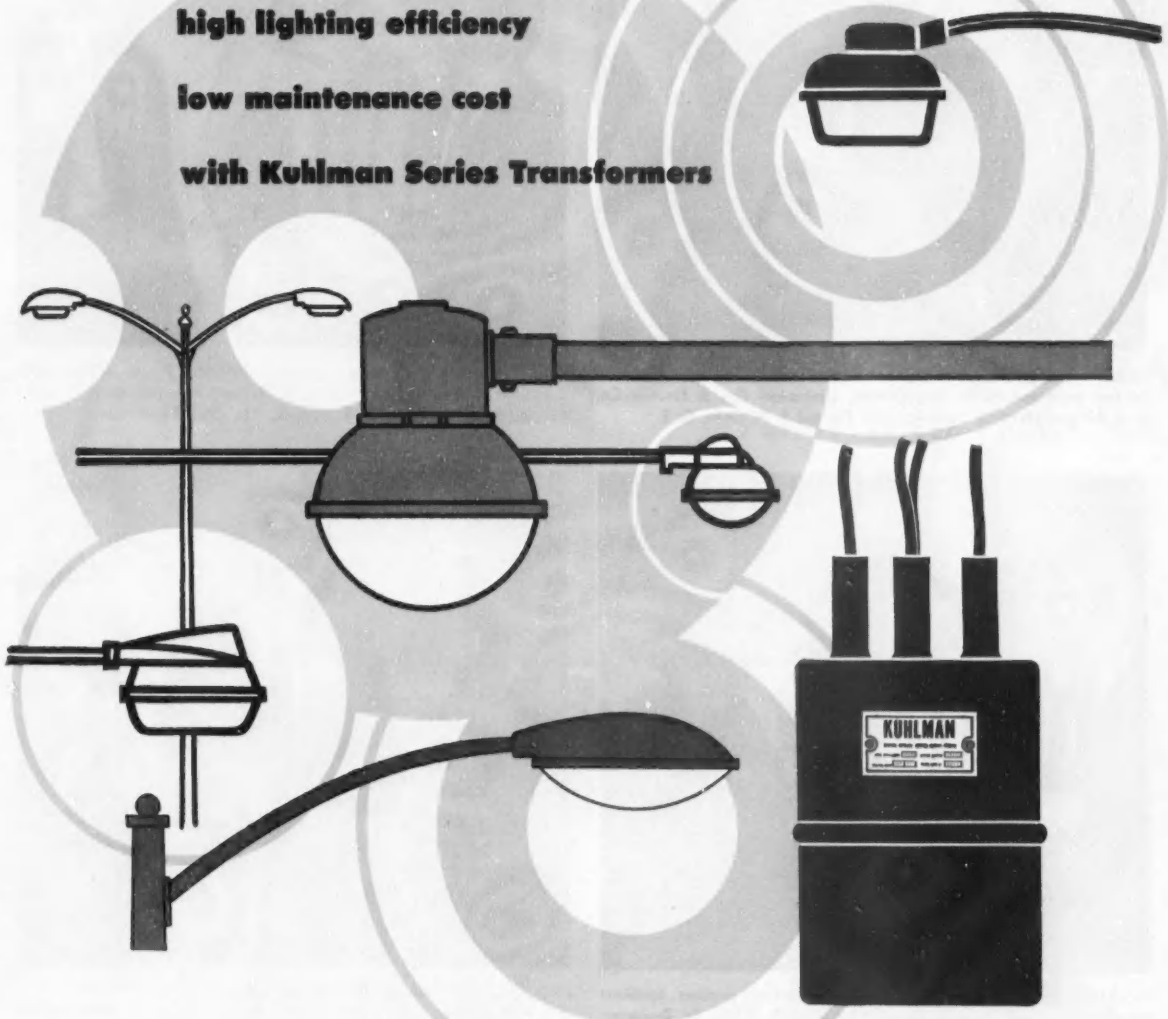
MARKETS AND SELLING speakers were A. D. Spillman, Phila. Electric Co and chairman of Conference Program Committee, R. W. Kise, G. E., Session Chairman, and W. C. Miller, Hartford Electric Light Co

METAL SHEATH HEATERS are examined by K. G. Adgate, EEI Commercial Dept Staff; George E. Whitwell, vice president, Philadelphia Electric Company, banquet speaker; and J. E. Friess, G. E.

high lighting efficiency

low maintenance cost

with Kuhlman Series Transformers



Utility executives know that maximum street lighting efficiency depends on good current regulation, for there lies the secret of greater illumination and longer lamp life in street lighting systems. Kuhlman Series Transformers, through the use of the bent iron core developed by Kuhlman engineers, provide current regulation that insures greater lighting efficiency at lower cost for Main Streets everywhere. Kuhlman Series Transformers, with a guaranteed current regulation of 1% over a range from 80% load to 110% load, help keep street lights burning brighter and longer.

Kuhlman Series Transformers permit the use of low voltage cable from transformer to lamp, eliminate system outages that are caused by trouble between the main circuit and the lamp, and help protect lamps from line surges. Compound filled and encased in a drawn copper bearing steel shell that is highly resistant to corrosion, these units require little or no maintenance. Kuhlman Series Street Lighting Transformers are made for manhole, pole base or aerial mounting. Utility executives can get complete information by writing for Bulletin CS-801. Kuhlman also manufactures Power, Dry Type, Subway, Saf-T-Kuhl, CSP and Rural Distribution Transformers. We will be glad to send you our bulletins on these units as well.

145-M

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY

HEATING LIQUIDS and the market potential for metal sheath heaters were covered by Eric O'Hara, Cincinnati Gas & Electric Co, J. H. Ahrens, Hartford Electric Light Co and R. A. Gehr, G. E.

ELECTRIC OVENS session speakers included P. A. Meyer, vice president, Michigan Oven Co, I. J. Barber, vice president, Fostoria Pressed Steel Corp and R. T. Boswell, The Ohio Power Co

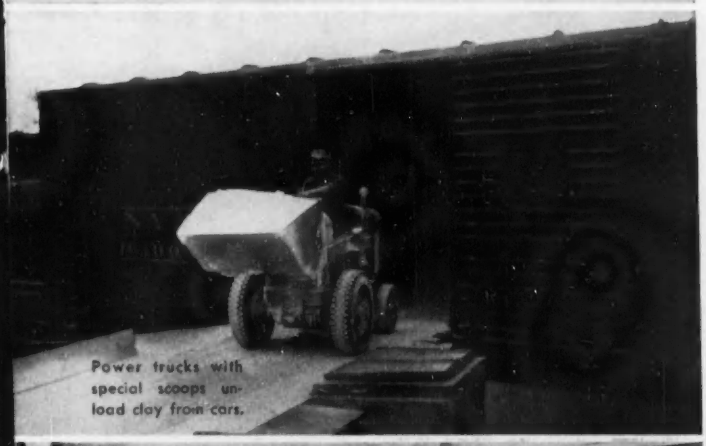
HEATING OF SOLIDS and Process Air Heating sessions speakers included George R. Conover, Westinghouse, J. B. White, Jr, Duquesne Light Co, W. S. Eyth and W. A. Everett, Cincinnati Gas & Electric Co

PROCESS HEATING speakers included Boyd Hopkins, Thermex Division, The Girdler Corp, Fred J. Jolly, Detroit Edison Co and Ben F. Roth, Pennsylvania Power & Light Co

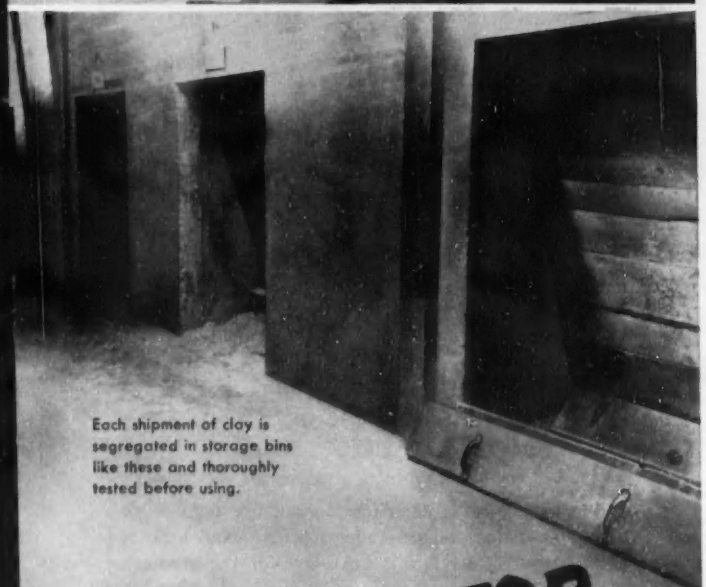
INDUSTRY'S EVALUATION of electric heat and manufacturer's viewpoint covered by F. W. McChesney, G. E., T. H. Spencer, Caterpillar Tractor, and Glenn S. Young, Kansas City Power & Light

CHAIRMAN AND SPEAKERS on "Process Heating" included F. R. Knipp, Dayton Power & Light Co, H. W. Memmott, Connecticut Light & Power Co (session chairman) and H. M. Webber, G. E.

The world's finest ceramic raw materials come from the states shown in color. Victor uses them exclusively.



Power trucks with special scoops unload clay from cars.



Each shipment of clay is segregated in storage bins like these and thoroughly tested before using.

Specify VICTOR PURIFIED PORCELAIN INSULATORS

Another Reason Why—

VICTOR Makes Better Insulators

WE USE AMERICAN CLAY, FLINT AND FELDSPAR EXCLUSIVELY!

BETTER INSULATORS begin with better materials. Victor was the *first* to recognize the superior qualities of *American* clays and the advantages of closer control over sources of supply. That's why Victor *Purified* Porcelain insulators have greatest uniformity in mechanical and electrical strength values. For the whole story, send for our free Booklet, "The Story of Victor and Purified Porcelain."

VICTOR NO. 9
LOW VOLTAGE
PINTYPE

VICTOR INSULATORS, INC., VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions
Guy Strains • Spools • Switch and Bus Insulators
Custom Designed Porcelain

CEI Stock Plan Popular . . .

. . . with its employees and officers. Utility reports that average monthly payroll deductions total about $36,813

Cleveland Electric Illuminating Co's employees are taking advantage of the utility's "employee thrift plan" which permits all permanent workers, including officers, to buy company common and preferred stock as well as U. S. savings bonds through payroll deductions.

The utility reports that by the middle of last month 1,400 of its 4,800 employees, or slightly better than 29% of the entire work force, were taking part in the investment plan, which was inaugurated last October.

Stock Purchase Breakdown . . . Of these 1,400, 703 or 50% were buying common stock, 173 or 12% preferred, and 518 or 38% U. S. bonds. A total monthly average of $36,813 was being paid through payroll deductions, averaging $26.29 per participant. Of the $36,813, approximately $27,000 was for stocks and $9,500 for bonds. Employees authorized a monthly deduction average of $31,000 when only U. S. bonds could be purchased through payroll savings.

In evaluating the plan's popularity among different employee groups, company figures show, as of Dec. 20, there were 1,356 participants. Here is the breakdown: 368 were supervisory and senior technical personnel (management), 685, unit personnel (union), and 303, nonunit personnel (clerical). Total employment figures on that same date show 750 in management categories, 2,807 union, and 1,125 clerical. Therefore, about 50% of management was taking part, and about 25% from the other two groups.

Morale Booster . . . In outlining the program's overall purpose, CEI Pres Elmer Lindseth said, "This broadened opportunity to save and take a personal interest in company affairs is expected to react favorably on the overall moral and efficiency of our employees to the benefit of all parties concerned, including our share owners and customers."

When the plan was first announced last September, information kits were sent to all employees advising them that stock could be purchased and explaining how it could be done.

Cites Plan's Advantages . . . Although many utility and industrial concerns now sell company stock to their employees. CEI believes its system is unique in that it incorporates the following advantages:

1. Emphasis is on long-term savings. To prevent speculative stock buying, investments are held to a maximum of 10% of the employee's weekly wage with a minimum at $4 per month.

2. Program is on a continuing basis. About 125,000 shares of CEI common have been set aside for employee purchase, but only 50,000 common, along with 10,000 CEI serial preferred $4.50 series, are currently authorized for sale.

3. Employees get a 15% discount on common stock at the time of purchase, 7½% discount on preferred.

4. Stock purchases are made semi-annually on Mar. 15 and Sept. 15. Thus monthly deductions are not subject to short-term market fluctuations.

5. Workers can withdraw from the plan, change their allotment or the type of security they are buying whenever they wish. However, they can sign up to buy only one type of security at a time.

Furthermore, CEI employees do not pay brokerage fees when stock is purchased, but once bought, they must pay brokerage fees in event of resale.

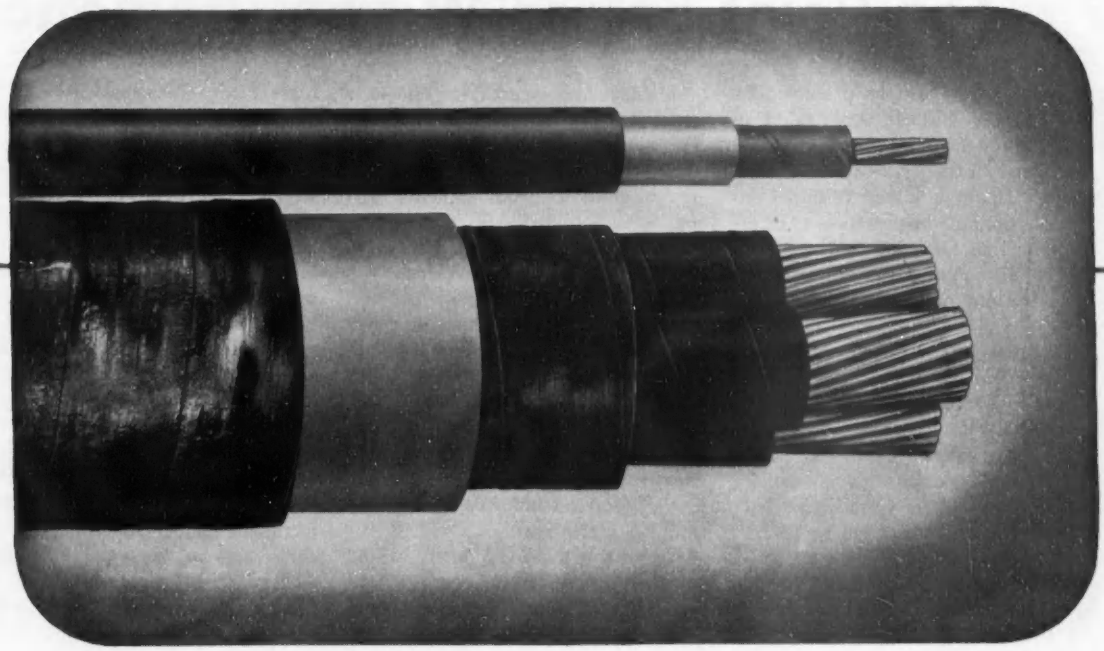
Central Hudson Helps Co-Eds

Central Hudson Gas & Electric Corp is currently conducting field work projects that are designed to give women college students a first hand look at the practices, policies and problems of a corporation. One of the students engaged in the field work is Lilian Weinberger, a Junior at Vassar College, Poughkeepsie, N. Y. Miss Weinberger is shown above getting some assistance from Henry Daniels (left) of the Cost and Rate Division and Jack McEnroe, rate analyst of that division.

Miss Weinberger, who hails from New York City, also studies under John R. Gardner, assistant vice president and manager of the Cost and Rate Division and Henry C. Strahan, supervisor of the division. The Vassar student's schedule with the company includes a four-hour period one day a week. Her program study covers department operation in the fields of general economics of the company, accounting budget, and cash budget.

ROEBLING PROTECTIVE COVERINGS ON LEAD SHEATHED CABLE

for utilities, chemical plants and the petroleum industry



LEAD SHEATHED CABLES used in certain applications by public and private utilities, chemical plants and the petroleum industry are often impaired by electrolysis or chemical corrosion. But such corrosive action can be effectively reduced, and cable life extended, by using Roebling Paper Insulated and Varnished Cambric Cables with either of two outer protective coverings.

One of these coverings is an extruded thermoplastic sheath employing a special high-molecular weight polyethylene. The other is ROESHEATH, built up of neoprene and neoprene-filled fabric tapes and vulcanized directly over the lead sheath. Both coverings not only provide essential protection, but, in some cases, may permit the thickness of the lead sheath to be reduced.

For longer, more dependable cable life and worthwhile economy write for full information... and get our recommendations for solving any special problem.

John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

A subsidiary of The Colorado Fuel and Iron Corporation

ROEBLING

ATLANTA, 934 AVON AVE • BOSTON, 51 SLEEPER ST & 5 PITTSBURGH ST • CHICAGO, 5525 W. ROOSEVELT RD • CINCINNATI, 3253 FREDONIA AVE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST • DETROIT, 915 FISHER BLDG • HOUSTON, 6216 NAVIGATION BLVD • LOS ANGELES, 5340 E. HARBOR ST • NEW YORK, 19 RECTOR ST • ODESSA, TEXAS, 1920 E. 2ND ST • PHILADELPHIA, 230 VINE ST • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST • SEATTLE, 900 1ST AVE S. • ST. LOUIS, 3001 DELMAR BLVD • TULSA, 321 N. CHEYENNE ST • EXPORT SALES OFFICE, TRENTON 2, NEW JERSEY

Ten-Point Better Wiring Promotion

Better wiring will be promoted by the Chicago Electric Association in 1954 through a 10-point program. The program was announced by H. C. Moses, Jr., at a Better Wiring Conference on Jan. 21st. Moses is chairman of the Adequate Wiring Committee. The Association plans to:

1. Develop more industry cooperation.
2. Raise a better wiring promotion fund.
3. Stage a better wiring exposition.
4. Promote wiring through an electric-living theater.
5. Take maximum advantage locally of the National Adequate Wiring Conference which will be held in Chicago this year.
6. Set up a program for selling better wiring to the building industry.
7. Make an aggressive effort to certify wiring in all of the Chicago Tribune's Festival of Homes.
8. Set up an all-inclusive advertising program to promote better wiring.
9. Establish an organized program with wiring contractor assistance.
10. Develop three pilot projects for home wiring modernization.

To develop more industry cooperation the program will attempt to enthuse all groups. The Adequate Wiring Reporter and the Electric Association News will be used. Every effort will be made to get more people in the electrical industry talking and thinking better wiring.

All firms within the industry will be solicited for funds for the development of the potential $100 million market for adequate wiring in new and old homes.

Better wiring Exposition in the Commonwealth Edison building, which ends Feb. 19, exhibits new methods and new products for greater electrical usages. Attendance of the building and real estate industries, as well as the home-buyihg public, will be stimulated.

An Electric Living Theater, sponsored by the Electric Association, will be a part of the Modern Living Exposition at Chicago's Navy Pier, April 3-11. An estimated 250,000 homemakers will attend this exposition.

Commonwealth Edison Co will contact home builders, apartment builders and others in the home building industry to sell adequate wiring. An effort will be made to show real es-

E. L. TAYLOR, Commonwealth Edison Co; H. C. Moses Jr, Thomas & Betts Co; A. H. Schneider, Commonwealth Edison Co; and C. C. Simpson, Chicago Electric Association, took part in conference program where the 10-Point Better Wiring Promotion was announced

Gets Started in Chicago

tate salesmen the sales appeal of adequate wiring.

Advertising will be carried on through: (a) Large billboards at new building projects; (b) Continued use of small outdoor AW signs; (c) Television; (d) Newspapers; (e) Industry truck decals; and (f) Office decals and signs.

Cooperation With Contractors . . . Contractors who sign to participate in the contractor cooperative plan will be provided with:

- An electric Association man each month to assist in better wiring promotion and sales, and to make calls with the contractor on prospective customers.
- Decals for their trucks and adequate wiring identifications for their place of business.
- Letters prepared by the Electric Association for a direct mail campaign by the contractor.
- An indoor advertising kit.
- Publicity in the industry advertising program.

Large signs for building projects and small signs for individual homes will identify adequate wiring installations and the electrical contractor who made the installation.

Three Pilot Projects . . . In home wiring modernization there will be three pilot projects, one each in the north, west and south areas of Chicago. They will be set up on the basis of approximately one square mile or 2,000 residential buildings. Most of the buildings will be single-family units.

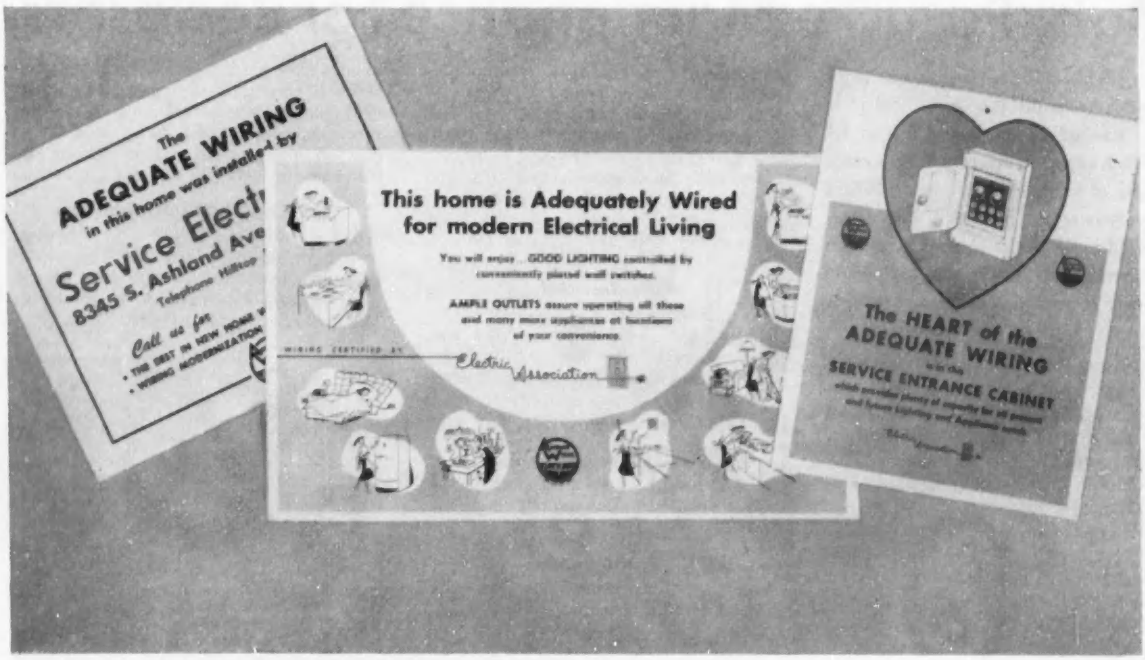
A direct mail campaign will be directed toward owners of these homes. A return post-card will seek inquiries from those really interested.

Telephone follow-up will be made on all who do not return inquiry card.

Leads developed will be called on by Commonwealth Edison and contractor representatives.

One contractor will be designated for each pilot project.

The three projects will be conducted for a three-month period. At the end of 30 days and 60 days a careful analysis will be made to determine possible changes in the program. A comprehensive report will be prepared at the end of the 90 day period. Recommendations will be made as to procedure or advisability of setting up a program throughout the area.


ADEQUATE WIRING
This home is Adequately Wired for modern Electrical Living
You will enjoy . . . GOOD LIGHTING controlled by conveniently placed wall switches.
AMPLE OUTLETS assure operating all those and many more appliances at locations of your convenience.
Electric Association
The HEART of the ADEQUATE WIRING
SERVICE ENTRANCE CABINET

CONTRACTOR'S ADVERTISING KIT contains such promotion pieces as these

1. Variac to control output voltage.
2. Range Switch transfers microammeter from 50 to 1000 microamperes range.
3. Guard Switch for by-passing stray currents to ground.
4. Neon Bulb protects against continuous overload.
5. Dual Range Microammeter measures leakage current.
6. Kilovoltmeter measures output voltage.
7. Calibration Curves translate microamperes into ohms resistance.
8. Power Switch (on-off control).
9. Grounding Post insures protection to operator.
10. Indicator Light (power on or off).
10
4
6
9
8
1
2
3
5
7

L-M DC Insulation Tester, being used to check insulation on a Kyle Type H Recloser.

L-M's New DC Insulation Tester Assures More Positive Maintenance For Reclosers

New portable unit operates on 120 volts, 60 cycles; requires low input power; is easily handled by one man. Use of DC gives high degree of accuracy, tells relative strength of insulation, and avoids useless replacement of good insulation. Completely protected so the device cannot be damaged by a short circuit; can measure any part of a number of insulation paths, one stringer or an entire recloser. Costs only $375.

L-M's new DC Insulation Tester is a highly efficient, low-priced portable unit that provides accurate determination of the condition of insulation in reclosers or other apparatus.

With this tester you can greatly improve recloser maintenance. It avoids replacement of insulation that is still in good condition; and it indicates when insulation should be replaced so that a recloser with faulty insulation is not put back on the line.

It may be hooked up to test the complete apparatus, or just one stringer in the unit.

It measures the DC insulation resistance of the entire apparatus or any part, at test voltages from 1 KV to 15 KV DC. It operates instantly, there being no vacuum tubes requiring a warm-up period.

Leakage current is measured by a dual range microammeter with a 50 microampere and a 1000 microampere range.

One man can operate the unit. It weighs only 50 pounds, so that it is easily transported. Input power is low. The tester may be supplied from any 120-volt 60-cycle source.

Fully Protected

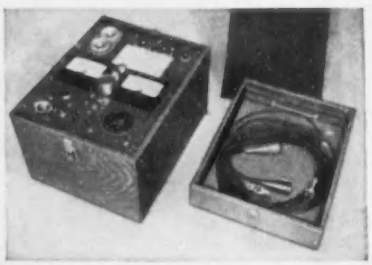
The microammeter is protected against sudden surges and protected against continuous overloads by a neon bulb that fires and by-passes the measuring circuit when an overcurrent occurs. Output current is limited in case of insulation failure by series resistors. The circuit high voltage components are protected against accidental over-voltages by an adjustable gap which discharges the output capacitor through a resistor.

Economical

The L-M DC Insulation Tester costs only $375.00. It takes out the guesswork and assures more positive recloser maintenance. A few moments' time can prevent hours of additional apparatus replacement, and the timely replacement of a faulty piece of insulation may prevent serious damage or complete destruction of valuable apparatus.

Get Complete Information

Ask the L-M Field Engineer for the new bulletin on the L-M Insulation Tester—or get a demonstration. Or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).



The L-M Insulation Tester is completely self-contained. Cover holds all leads, power cord, and instruction book. The whole unit weighs only 50 pounds.

155-R

LINE MATERIAL

Kyle® Reclosers

New L-M Manual Remote Control for Reclosers Saves Trouble Trips, Improves Customer Service

L-M's Remote Control for Kyle Type H Reclosers provides manual operation from the base of the pole. It eliminates the need for climbing the pole. No switch stick is needed. Anyone can be instructed to operate the device. The handle can be locked to prevent unauthorized operation.

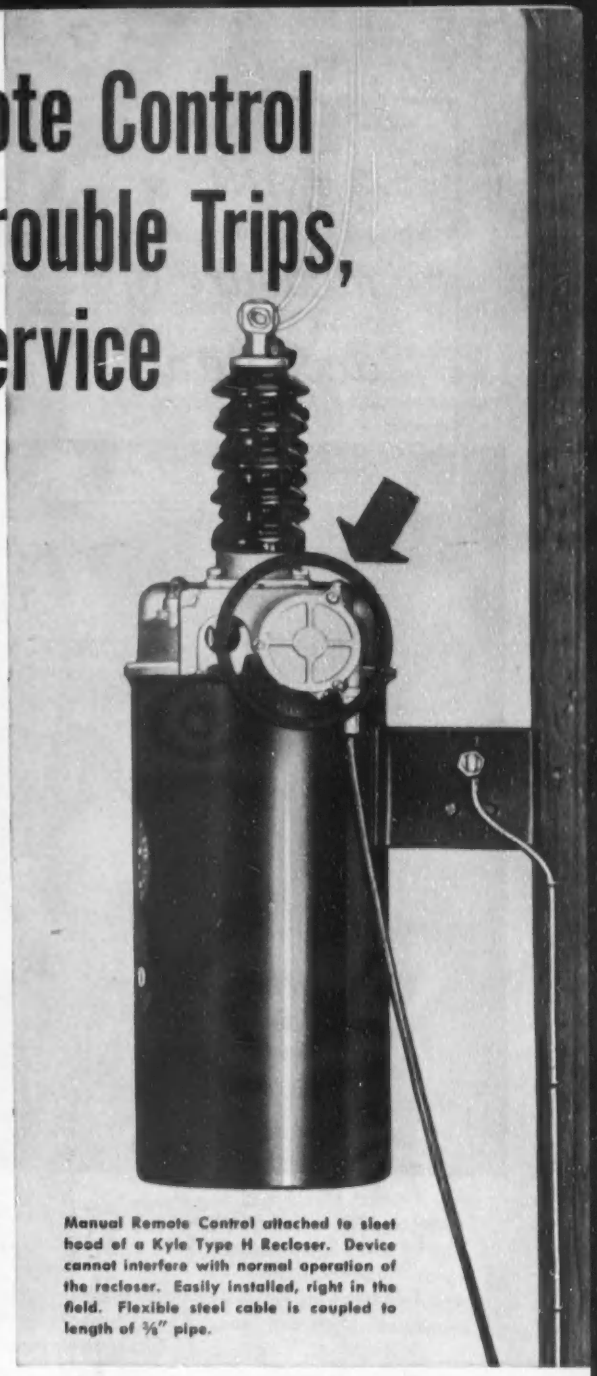
Use of the device eliminates the need for sending a line crew to open or close a recloser. Farmers or property owners in remote locations can be provided with a key so that they can operate the control upon telephone instructions. This can be particularly valuable when roads are blocked by mud or snow. The saving on one service trip by a crew more than pays for the device.

Let Us Give You Complete Information

Ask the Line Material Field Engineer for details on the L-M Remote Control, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Features of the L-M Manual Remote Control for Kyle Reclosers

- Designed for simple operation from the base of the pole.
- No switch stick required.
- Permanently lubricated for a lifetime of use. Sealed against damage or interference by insects and weather.
- Allows trip-free operation under fault conditions. The device cannot hold recloser in against a fault.
- Easily installed; may be added to Kyle Reclosers right in the field.
- Control handle can be locked to prevent tampering.
- Available for pole or cross-arm mounting for 1-, 2-, or 3-phase operation. One handle operates all reclosers simultaneously.
- Field-tested under various climatic conditions to assure positive operation.



Manual Remote Control attached to steel head of a Kyle Type H Recloser. Device cannot interfere with normal operation of the recloser. Easily installed, right in the field. Flexible steel cable is coupled to length of ⅜" pipe.

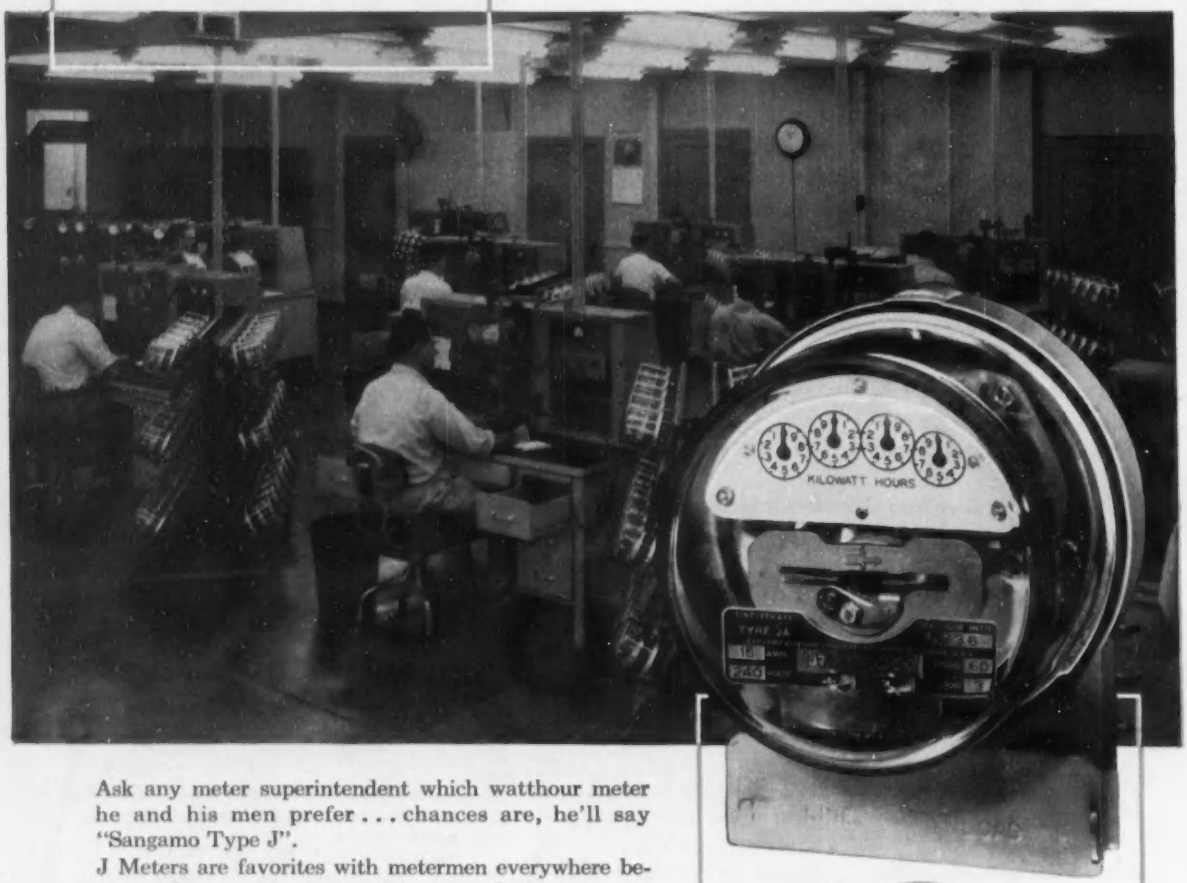
Operating handle at base of pole, also coupled to ⅜" pipe with coupling provided. Handle can be locked to prevent tampering, but is easily operated by authorized persons. No switch stick needed!

LINE MATERIAL

Kyle® Reclosers

a full measure of acceptance

Sangamo J Meters



Ask any meter superintendent which watthour meter he and his men prefer . . . chances are, he'll say "Sangamo Type J".

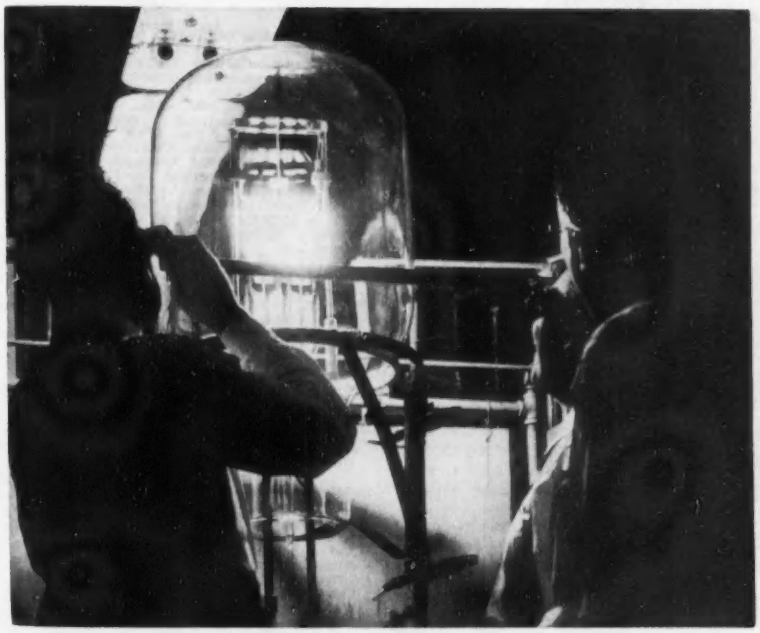
J Meters are favorites with metermen everywhere because they are easy to calibrate and they *stay* in calibration! They do facilitate the maintenance and testing program of the meter department—and they are known for extremely long troublefree service.

Sangamo J Meters are built to provide the unchanged accuracy necessary to measure all the electricity delivered over a period of many years. Careful attention to those qualities necessary for accurate measurement with minimum maintenance has always guided the design and manufacture of Sangamo Meters.

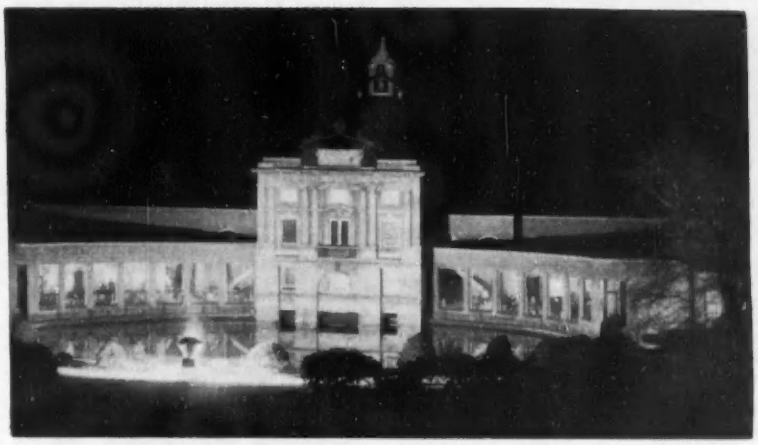
SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

Only Measured Facts are Known Facts

JM53-6



The world's largest light bulb . . .



. . . spotlights GE's Lighting Institute

The world's largest artificial light source—a 75,000-w incandescent lamp bulb developed by General Electric Co—was turned on officially at ceremonies held at Rockefeller Plaza in New York City on Thomas Edison's 107th birthday last Thursday. The bulb, half again as large as the previous largest bulb, was developed as a feature of GE's observance of Light's Diamond Jubilee during 1954. The bulb, 23 of which would light a major league baseball park, will be displayed at conventions, shows, and fairs, in all sections of the country.

The lamp, which produces 2.4 million lumens, was conceived, designed, and assembled by GE scientists and engineers at Nela Park in Cleveland. Its 12½-ft filament alone weighs 2.7 lb, which is enough tungsten to make the coiled-coil filaments for 67,500 60-w lamps. The pictures show: (above) development engineers, using heavy glasses, studying the lamp's performance at close range; (below) the lamp illuminating the GE Lighting Institute in Cleveland during its first nighttime demonstration.

Alcoa Would Build

Willing to invest in hydro dams to firm up Northwest power supply

Aluminum Co of America is "ready and willing to consider investing its own money" to build hydroelectric power dams in the Pacific Northwest. According to C. S. Thayer, manager of Alcoa's Northwest operations, it would do so to:

- Protect its multi-million dollar investment based on previous availability of low-cost hydroelectricity.
- Firm up the indefinite power supply which affects the company's future plans in the region.

In a lengthy statement issued early this month, Thayer indicated that "informal conversations in many quarters" had already been held towards getting more generating power with Alcoa's help.

He added that the company would be willing to work with either private companies or public agencies, as the situation warranted. Talks held so far —which he labeled "extremely tentative"—have been with private companies. Alcoa's Vancouver, Wash., plant buys direct from Bonneville Power Administration; its Wenatchee, Wash., plant from Chelan PUD.

Doubtful Future . . . Thayer pointed out that Alcoa was "quite concerned" about its inability to make long-term arrangements that would firm up the interruptible power for both plants as well as "with the unpredictable supply of metal for any fabricating plants that might be based on aluminum supply produced from such an indefinite power supply."

Thayer emphasized that Alcoa "has steadfastly refrained from entering into political or other controversies with respect to the power situation." However, he added, Alcoa had a leading role when direct power customers of BPA attacked the long-term contracts the federal agency negotiated last year with private utilities. These limited the aluminum and other electro-process plants to existing loads until the utilities were receiving an equal amount of energy from future generation increments in the Columbia River system.

Thayer declared in his conclusion:

"Alcoa has great faith: (1) the policies now being pursued by all interests in the Northwest will encourage substantial expansion in the generation of power from the great hydroelectric resources of the area; (2) that the aluminum industry and its future are indelibly stamped in the future progress of the Nothwest; (3) that the people of the Northwest would like to see the aluminum industry remain and grow in this area; (4) that from the mutually cooperative effort now developing, the electroprocess and electro-chemical industries as a whole will be encouraged to expand and thus make an even greater contribution to the progress of this great area."

MANUFACTURING BRIEFS

Aluminum Association announced that primary aluminum production rose to a new U. S. high of 2,504,029,277 lb last year, about a third more than the 1952 output of 1,874,664,367 lb. Producers turned out 220,582,988 lb of aluminum ingot and pig in December, against 211,273,802 lb in November. The jump reflected new production capacity and speeded up operations, plus easing of hydro shortages in Tennessee Valley.

Allen-Bradley Co began production last month at its new Canadian plant at Galt, Ont. The 45,000 sq ft plant, the firm's first branch operation, is operating as Allen-Bradley Canada, Ltd. It is now producing only electrical industrial motor controls. Its line of radio parts will be added later.

West Germany's electrical industry produced goods worth 6,750 million D-marks last year, an increase of about 650 million marks over the 1952 figure. Largest increases were registered in consumer goods, especially household appliances and small electrical equipment, and in electric vehicles and transformers. Output of motors, generators, accumulators, and low-voltage switchgear declined slightly. Exports were worth 1,250 million marks, against 1,046 million in 1952.

SALES ASSIGNMENTS

COMPANY STAFFS

Libbey-Owens-Ford Fiber Glass Division has named Ned P. Kimberly district sales manager of the Cleveland area, and John A. Webb a sales representative in New York. Kimberly had been a sales representative in Cleveland for a year, and Webb held a similar post in Chicago.

Electric Controller & Mfg Co, Cleveland, has opened a sales and engineering office at 6066 E. Olympic Blvd, Los Angeles, with John R. Woodruff as Pacific Coast district manager. The district embraces Los Angeles, San Francisco, Seattle, Spokane, Portland, Vancouver, B. C., Edmonton, Alb., and Winnipeg, Man.

General Electric Co has named Richard M. Ryan as manager of its apparatus sales office at Peoria, Ill. He succeeds W. A. Knight, who was killed in an auto accident last November.

Line Material Co has announced opening of new buildings for sales and branch offices in Chicago, Los Angeles, and Portland, Ore. New Los Angeles office-warehouse is located at 6490 E. Fleet St. P. J. Walz is branch manager and P. K. Churchill division manager. New Chicago sales office is at 4700 Lake St., Melrose Park. J. J. Desmond is district manager and G. S. McLellan is branch manager in charge of marketing. The Portland building is at 1333 N.W. 12th St. H. M. Porter is branch manager.

REPRESENTATIVES

T. J. Cope, Inc, Philadelphia, has appointed the Jacksonville office of Gearhart Co of Atlanta as sales representatives in Florida. The firm already represents Cope in Georgia, Alabama, and eastern Tennessee.

Electrical Engineers Equipment Co has named Harry J. Fisher Associates as representatives in northern Ohio, and Kemp Electric Sales Agency, 6218 Sunshine Dr., St. Louis, representatives in eastern Missouri and southern Illinois. Fisher has offices at 7016 Euclid Ave., Cleveland; 207 Earl Hibbard Bldg, Cuyahoga Falls; 208 Diana Dr., Poland; and 614 Park Dr., Columbus.

MANUFACTURERS' EARNINGS

Company	Period Months	Ended	Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
Copperweld Steel	12	Dec.	$2,844,719	$2,304,387	$5.03	$4.38
Koppers	12	Dec.	9,025,981	8,612,822	4.51	4.29
Owens-Corning Fiberglas	12	Dec.	14,959,034	12,255,497	1.70	1.61
Rome Cable	3	Dec.	326,000	492,000	.65	1.00
Rome Cable	9	Dec.	1,259,000	1,550,000	2.52	3.17
Union Carbide & Carbon	12	Dec.	102,783,442	98,320,699	3.55(a)	3.41(a)

Note—(a) Based on shares outstanding at close of the period.

MEETINGS CALENDAR

Edison Electric Institute
Electrical Equipment Committee, Sheraton Cadillac Hotel, Detroit, Mich., Feb. 15-16; Commercial Space Heating and Air Conditioning Committee, Tutwiler Hotel, Birmingham, Ala., Feb. 18-19; Industrial Relations Committee, EEI Headquarters, New York, March 18; 20th Annual Sales Conference, Edgewater Beach Hotel, Chicago, April 5-8; EEI-AGA Accounting Conference, Hotel Statler, Boston, April 12-14; Industrial Relations Committee, Netherlands Plaza Hotel, Cincinnati, Ohio, April 15; Annual Convention, Atlantic City, N. J., June 1-4.

Pennsylvania Electric Association
Prime Movers Committee, Hotel Robert Treat, Newark, N. J., Feb. 15-16; Systems Operation Committee, Fort Stanwix Hotel, Johnstown, Pa., Feb. 18-19; Electrical Equipment Committee, Hotel Roosevelt, Pittsburgh, Feb. 25-26; Relay Committee, Benjamin Franklin Hotel, Philadelphia, March 4-5.

National Association of Purchasing Agents
Mid-Winter Conference, Public Utility, Buyers' Group, Lord Baltimore Hotel, Baltimore, Md., Feb. 15-16.

Public Information Program
Inter-Regional Committee, Blackstone Hotel, Chicago, Feb. 17; East North Central Region, Cleveland, Ohio, Feb. 25.

National Adequate Wiring Bureau
10th Annual National Adequate Wiring Conference, La Salle Hotel, Chicago, Feb. 25-26.

Public Utilities Advertising Association
Region 1 Meeting, Sheraton-Mount Royal Hotel, Montreal, Que., Feb. 25-26; National Convention, Hotel Statler, Boston, May 13-14.

National Electrical Manufacturers Association
Spring Meeting, Edgewater Beach Hotel, Chicago, March 8-11.

***Pacific Coast Electrical Association**
Engineering and Operating Sections, Mark Hopkins Hotel, San Francisco, March 18-19; Administration Services Section, Hotel Claremont, Berkeley, Calif., April 7-8; Annual Convention, Hotel Del Coronado, Coronado, Calif., May 19-21.

Southeastern Electric Exchange
21st Annual Meeting, Boca Raton Hotel, Boca Raton, Fla., March 22-24; Spring Meeting, Engineering and Operation Section, Sans Souci Hotel, Miami Beach, Fla., May 6-7.

American Power Conference
Sherman Hotel, Chicago, March 24-26.

Northwest Public Power Association
Annual Convention, Winthrop Hotel, Tacoma, Wash., March 31-April 1-2.

Northwest Electric Light & Power Association
Engineering and Operation Sections, Olympic Hotel, Seattle, Wash., April 15-17; Business Development Section, Hotel Boise, Boise, Idaho, May 10-12.

***American Institute of Electrical Engineers**
Conference on Feedback Control, Claridge Hotel, Atlantic City, N. J., April 22-23; Northeastern District Meeting, Schenectady, N. Y., May 5-7; Conference on Telemetering, Morrison Hotel, Chicago, May 24-26; Summer General and Pacific General Meeting, Hotel Biltmore, Los Angeles, June 21-25; Fall General Meeting, Chicago, Ill., Oct. 11-15.

CIGRE
International Conference on Large Electric High-Tension Systems, Paris, France, May 12-22.

***American Society of Mechanical Engineers**
Semi-Annual Meeting, William Penn Hotel, Pittsburgh, June 20-24; Fall Meeting, Schroeder Hotel, Milwaukee, Wis., Sept. 8-10.

*Addition this week.

THESE PORCELAINS ARE FOR DISCONNECT SWITCHES

Because of the seriousness of failure of equipment of which these insulators are components, the highest order of electrical reliability is required. Lapp porcelain, and Lapp testing procedures, meet this specification.

Because the final assembly is as compact as possible, tolerances are close; accuracy must be maintained for interchangeability of parts.

As much as we know about porcelain, we still can't claim to maintain machine-shop tolerances in firing. Nobody can. Final dimensional accuracy in many pieces is achieved by grinding. In these pieces, end surfaces are ground. In addition, alloy inserts are cast directly into the porcelain to provide accurate and accurately-centered twin hexagonal shapes for mounting.

We would like to call your attention to the fact that the casting of metal inserts into porcelain is a most useful device for indoor use and/or where dimensional accuracy is important. This technique, in which Lapp has acquired considerable proficiency, provides a degree of precision in many cases obtainable in no other way.

Our customer for the pieces shown here is aware that these are "difficult pieces." We are pleased that his highest standards—both mechanical and electrical—are being met. We are proud to report that not even occasional pieces are rejected.

Lapp insulators seldom carry the lowest initial cost. But the value shows up, in this case, in production economy in subsequent manufacture. And on your system, in extra operating security, longer life, lower upkeep.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

Commonwealth Gets Increase

Illinois Commerce Commission approves electric-gas rate hike which yields $20 million annually to Chicago utility

Illinois Commerce Commission has granted Commonwealth Edison Co a 6.5% increase in electric and gas rates amounting to $20,480,000 annually. This is a return of 5.8% on a rate base of $792 million that is applicable to the company's electric operations.

In the opening remarks in the order of Jan. 16 ICC stated that ". . . the City of Chicago presented a motion that the company be directed to prepare and present in these proceedings exhibits showing the cost of providing electric energy for each class of customer within the City of Chicago and each class of customer in the territory outside the City of Chicago . . ."

The commission in denying the motion said: ". . . the objections to the motion [by the company] showed that at least 29 different theories for the allocation of generating and transmission costs among classes of service have been evolved, and that none has met with general or authoritative acceptance. The commission saw no occasion in this general rate proceeding for a costly, time-consuming excursion into the doubtful realm of class of service cost allocations, upon the preparation of which there is major disagreement among experts."

Depreciated Original Cost . . . As to the depreciated original cost of the property, ICC stated that "At Jan. 1, 1953, and July 31, 1953, original cost depreciated of the electric utility plant was $762,050,074 and $783,977,239, respectively."

The commission said, "The original cost less depreciation of each utility plant has been taken into account by the commission as a significant component of present fair value."

While Commonwealth claimed a "Reproduction Cost New" less observed depreciation for its plant of $1,255 million as of July 31, 1953, based on a price level as of Jan. 1, 1953, and $1,177 million on the basis of an average 1950-52 price level, the commission found that the RCN less depreciation was $1,176 million.

As to working capital, the commission allowed $46 million of $48.4 million claimed by the company as working capital needed for electric operations for the 12 months ended July 31, 1953. The total of the original cost depreciated of the property plus the allowance for working capital was found to be $830 million. This was $38 million in excess of the rate base found by the ICC.

With regard to the fair value of the property, ICC stated "The Commission has given full consideration to the evidence relating to depreciated original cost, depreciated reproduction cost, the condition and operating efficiency of the various properties, the construction in progress or planned, materials and supplies and working capital, as well as other evidence and data bearing upon the present fair value.

"The earnings which will be yielded by the proposed rate increases constitute a fair reasonable rate of return on respective rate bases for the electric utility plan and gas utility plant which are less than the fair value of such properties."

Bonbright's Testimony . . . Regarding rate of return evidence offered by the company, the analysis of Dr James C. Bonbright indicates that ". . . the 'bare bones' cost of money to the company amounts to 5.63% upon its total investment, and that a reasonable rate of return should be not less than 6%."

Dr Bonbright contended that the proposed amount of three-eighths of 1% above and beyond the "bare bones" cost of capital was ". . . so modest that a detailed defense is hardly necessary. He testified that an adjustment from 'bare bones' cost of money to reasonable rate of return is required to cover the variety of risks and inadequacies with which the forecast of earnings and expenses is necessarily fraught."

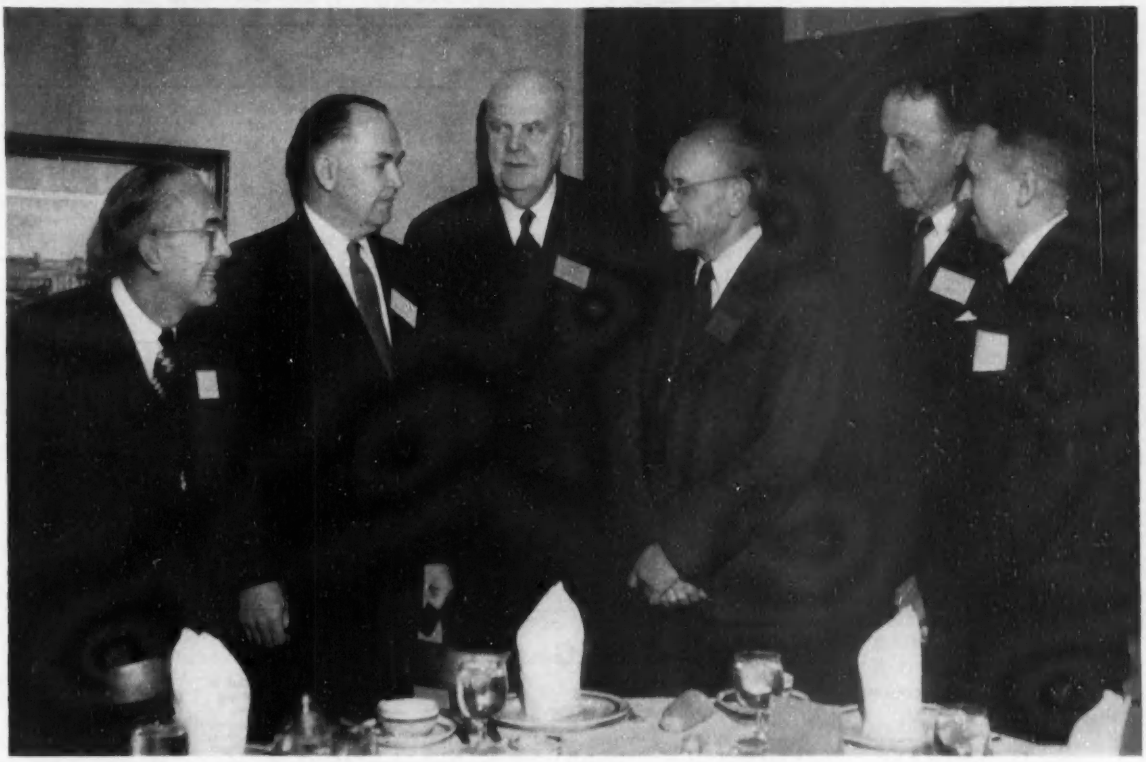
In analyzing the rate of return, ICC concluded that it had ". . . examined the requirements of the company in the light of prevailing economic conditions and the trends of the money markets. In computing a rate of return, consideration must be given to many imponderables, without the benefit of measurable exactitudes. It is upon all of the circumstances of this particular situation that we must rest our conclusion with respect to the rate of return. We are of the opinion that a rate of return of 5.8% with respect to the company's electric utility property and a rate of return of 5.85% with respect to its gas utility property are fair and reasonable."

In arriving at the reasonable of net operating income, ICC gave consideration to the company's claim for economic depreciation. The agency stated: "The company asserts that its annual allowance for depreciation in fact understates the value of the plant worn out in service during the accounting year. This claim rests upon the fact that, under prevailing price levels, replacement facilities cost considerably more than—as much as double—the original cost of facilities retired."

The ICC contended that "only by such provision . . . can the actual value of the property used up in rendering public utility service be returned to the investor. This theory of economic depreciation is of rather recent origin, has been widely discussed and has been accepted in only isolated instances. It has not as yet been adopted by this commission. It presents significant and challenging implications which need not be explored in this proceeding in view of the fact that the company's test year statements do not claim economic depreciation, and in view of the further fact that the earnings yielded by the proposed increases, without the benefit of economic depreciation, are not beyond the fair rate of return provided by law."

Commonwealth's Earnings . . . Concerning the company's earnings, ICC noted that "an exhibit prepared for Dr Bonbright . . . shows for the calendar year 1952, the company's earnings on invested capital amounted to 4.8%, compared with an average of 6% for the entire electric industry, and an average of 6% for 20 comparable

(*Continued on page* 64)



Top holding company officials tell security analysts meeting that '54 . . .

Earnings Are Expected to Hover Around '53

Although operating revenues for five electric holding companies may be higher for 1954, their earnings per common share are expected to remain "around" 1953 levels. These predictions were made by utility officials to security analysts participating in a recent one-day field trip in New York in conjunction with third eastern regional conference sponsored by the New York Society of Security Analysts. John F. Childs, vice president, Irving Trust Co, directed the trip.

Holding companies visited were General Public Utilities Corp, West Penn Electric Co, Southern Co, American Gas & Electric Co, and Middle South Utilities, Inc.

Over $3.2 Billion Invested In Plant . . . These five companies have 25 subsidiary companies which have over $3.2 billion invested in utility plant in 16 states. The gross revenues totaled over $455 million in 1953. Construction expenditures amounted to $455 million in 1953. An estimated $375 million has been budgeted for 1954. The dividend payout for these companies is running between 66 to 75% of earnings.

The analysts first heard GPU's Pres A. F. Tegen say that earnings per common share in 1954 "will do at least as well in 1953" when $2.02 was earned on the average shares outstanding during the year. He pointed out that the system's new generating facilities are in the western part of Pennsylvania where fuel costs are much lower than those in the eastern part. This will definitely help the earnings picture, he said.

The GPU system is the only one which will sell common stock to the public in 1954. A total of 600,000 shares will be offered in March or April as a "rights" offering to stockholders.

Industrial Power Sales Off . . . "Power sales to industrial customers have receded from highest previous levels," West Penn's Pres Earle S. Thompson pointed out. Despite this, he said, the earnings for 1954 will hit the $3.40 a share earned in 1953 or may go "slightly higher." He feels that the company will probably not do any common stock financing until 1956.

James F. Crist, vice president, Southern Co, declared there are indications of a "general leveling off of business in 1954." Yet for the long pull, he said, "We can see no signs of a marked departure from the uptrend of the Southeast's industrial progress." He further stated that even though the system's 1954 load forecast predicts a decrease of 6 to 8% in the Federal Reserve Board Index of industrial production below 1953, a "moderate increase" in sales to industrial customers is expected.

The Southern Co's Chairman, E. A.

Picture: Security Analyst E. L. Savage, New England Trust, (extreme right) discusses utility field with (l to r) H. A. Busch, GPU; Edgar H. Dixon, Middle South; E. A. Yates, Southern; Philip Sporn, American G&E; and Earle S. Thompson, West Penn.

Yates, revealed that the board considered raising the common stock dividend at its January meeting but decided to hold off until later in the year to see if earnings would improve.

AG&E Record Earnings . . . Consolidated earnings for AG&E common stock hit a record $31 million in 1953, Pres Philip Sporn pointed out. Earnings per common share in 1953 amounted to $2.49 on 12,439,748 average number of shares outstanding. He made no forecast on 1954 earnings.

Middle South's Pres Edgar H. Dixon said that earnings were $1.98 a share for 1953. Although residential revenues are expected to increase 9% in 1954, commercial 6%, and industrial 14%, a good part of which will come from the new Reynolds Metals aluminum plant that went on the line in Arkansas on Dec. 31, 1953, earnings per common stock will be about the same as in 1953. He also noted that the 1953 earnings included 29¢ a share for "interest during construction" which will go down to 12¢ a share in 1954.

Commonwealth Increase

(*Continued from page* 62)

companies (which are the largest in size and which serve the principal metropolitan centers). For the entire post-war period, the national average is 6%, for the selected 20 companies, 6.1% and that of the company, 5.1%."

For segregation of facilities requested by the city, ICC had this to say: "The City of Chicago takes the position that operating revenues and expenses should be segregated between service to customers within the City and service to customers within the remaining Illinois territory. Neither from the physical operating facts nor principles of sound regulation would such allocation be warranted."

In its findings, ICC concluded that "the earnings of the company's electric operations which will be yielded by the proposed rates of charge represent a 5.8% return on a rate base of $791,986,569. The fair value of the company's utility plant used and useful in rendering electric service at July 31, 1953, including the foregoing allowance for materials, supplies, and working capital, was, as of that date and is now, in excess of the amounts of such computed rate base. The fair value of the company's utility plant used and useful in rendering electric service, including the foregoing allowance for materials, supplies, and working capital, was, as of July 31, 1953, and is now, in excess of the rate base computed on a 5.8% capitalization of the highest estimate of electric utility earnings for the calendar year 1954 upon the basis of the proposed rates of charge."

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE 1954									
Feb. 4	**2.94**	**2.99**	**3.21**	**4.04**	**4.12**	**4.50**	**4.89**	**5.33**	**5.36**
Jan. 28	2.94	2.99	3.21	4.06	4.17	4.51	4.94	5.40	5.41
END OF QTR.									
4th 1953	3.07	3.12	3.34	4.17	4.32	4.62	5.07	5.57	5.51
3rd 1953	3.30	3.33	3.54	4.35	4.52	4.83	5.36	5.97	6.01
2nd 1953	3.34	3.46	3.64	4.47	4.70	4.88	5.52	5.93	6.10
1st 1953	3.15	3.23	3.39	4.16	4.41	4.66	4.95	5.24	5.50

Data: Reis & Chandler, Inc.

EARNINGS

Company	Period Months Ended		Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
Central Hudson Gas & Electric	12	Dec.*	$2,781,124	$2,454,768	$0.903(a)	$0.848(a)
Central Maine Power	12	Dec.*	4,554,210	4,630,043	1.45	1.48
El Paso Electric	12	Dec.*	1,680,680	1,554,388	2.11(b)	1.95(b)
Idaho Power	12	Dec.*	4,502,831	3,806,238	3.35	2.75
Long Island Lighting	12	Dec.*	7,467,803	6,311,930	1.23(c)	1.26(c)

Notes—* Subject to year-end audit; (a) Based on 2,259,642 shares in 1953 and 2,021,399 shares in 1952; (b) Based on 2,492,605 shares outstanding in 1953; and (c) Based on 4,979,777 shares in 1953 and 4,349,581 shares in 1952.

FINANCING

Company and Description	Amount of Offering ($000)	Offering Price	Yield to Public
WEEK OF FEBRUARY 4-10			
Bonds			
Public Service Co of Oklahoma—1st mtg 3% due 1984	$12,500	99.021%	3.05%
Louisville Gas & Electric—1st mtg 3⅛% due 1984	12,000	102.461	3.00
Common Stock			
Black Hills Power & Light—14,100 sh (being offered to commonholders on the basis of 0.0597 of a share for each share held on Jan. 27 to expire Feb. 15; with oversubscription privileges).	$275	$19.50	6.56%
SCHEDULE FOR FEBRUARY—MARCH—APRIL—MAY			
Bonds			**Bid Date**
Pacific Gas & Electric—1st mtg due 1984	$60,000	.....	Feb. 16
Essex County Electric—1st mtg due 1984	5,000	.....	Feb. 17
Atlantic City Electric—1st mtg due 1984	5,000	.....	Feb. 24
Houston Lighting & Power—1st mtg due 1989	30,000	.....	Mar. 1
Suburban Electric—1st mtg due 1984	4,000	.....	Mar. 3
Alabama Power—1st mtg due 1984	17,000	.....	Mar. 16
El Paso Electric—1st mtg due 1984	5,000	.....	Mar. 16
San Diego Gas & Electric—1st mtg due 1984	17,000	.....	Mar. 30
Georgia Power—1st mtg due 1984	11,000	.....	April 6
Southern Indiana Gas & Electric—1st mtg due 1984	8,000	.....	April 13
Ohio Power—1st mtg	20,000	.....	April 14
West Penn Power—1st mtg due 1984	12,000	.....	April 20
Utah Power & Light—1st mtg due 1984	15,000	.....	May 19
Community Public Service—1st mtg due 1984	3,000	.....	.....
West Penn Power—1st mtg	12,000	.....	.....
California Oregon Power—1st mtg due 1984	10,000	.....	.....
Preferred Stock			
El Paso Electric—15,000 sh no par	$.....	.....	Mar.17
Northern States Power (Minn.)—150,000 sh $100 par	15,000	.....	April 14
Arkansas Power & Light—70,000 sh $100 par	7,000	.....	April 27
Common Stock			
Atlantic City Electric—151,672 sh	$.....	.....	Feb. 19
Missouri Public Service—527,865 sh (to be offered common holders on a sh-for-sh basis)	$.....	.....	.....
Utah Power & Light—200,000 sh	.....	.....	Mar. 23
Southern Indiana Gas & Electric—114,166 sh (to be offered commonholders on a 1-for-7 basis, record about Mar. 24 to expire April 9)	.....	.....	.....
South Carolina Electric & Gas—286,436 sh (to be offered commonholders on a 1-for-10 basis, record Feb. 17 to expire Mar. 3; with subscription privilege, including subscription privilege for holders of less than 10 shares)	.....	.....	.....
Southern California Edison—600,000 sh	.....	.....	.....
El Paso Electric—76,399 sh (to be offered commonholders on 1-for-10 basis, record Feb. 23 to expire Mar. 11)	.....	.....	.....
California Oregon Power—300,000 sh	.....	.....	.....

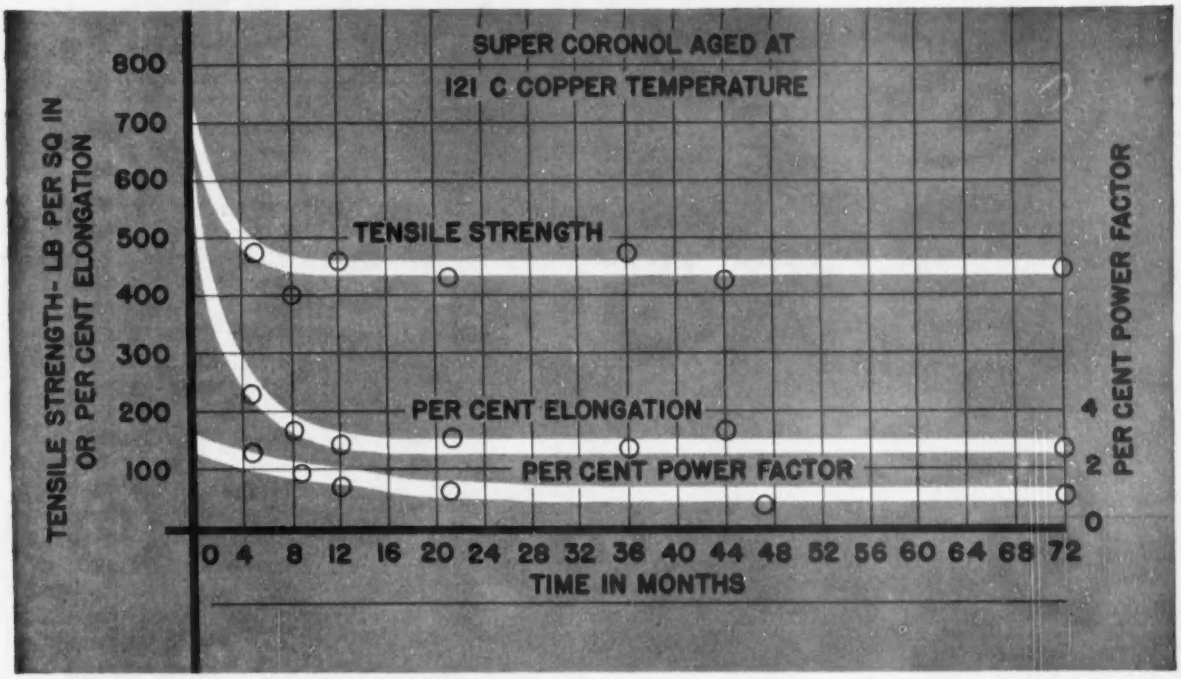


Fig. I: Physical and electrical properties of G-E Super Coronol cable as demonstrated by long-time tests at 121 C copper temperature.

Greater service-life expectancy from General Electric Super Coronol cable

Aging tests at 121 C give results equal to 72 years test-life at operating temperature

General Electric Super Coronol* cable has been tested under load for six years at a continuous copper temperature of 121 C. Both physical and electrical properties have been stable since the 20th month. (See Fig. I.) Following the general rule that insulation life is doubled for every 8 to 10 C decrease in temperature, these data at 121 C indicate from *72 to 135 years of test-life* at the rated temperature of 85 C.

These tests, supplemented by many others, demonstrate the justification for basing the ratings of all G-E Super Coronol power cables, for service up to and including 8000 volts, on a permissible maximum copper temperature of 85 C, and for permitting emergency overload temperatures. (See Fig. II.) Super Coronol cables are available as single-conductor cables (shielded and unshielded), preassembled aerial cables, submarine cables, and power cables. For further information on Super Coronol cables and other General Electric wire and cable products and systems, consult your G-E cable specialist, or write Section W-113-227 Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

Fig. II: Allowable Operating Temperatures Super Coronol-Geoprene Cable

Voltage Rating	Normal Loading	Emergency Overloading	Short Circuit Loading
0-1000	85 C	115 C	150 C
1001-5000	85 C	102 C	145 C
5001-8000	85 C	100 C	140 C
8001-15000	80 C	90 C	120 C

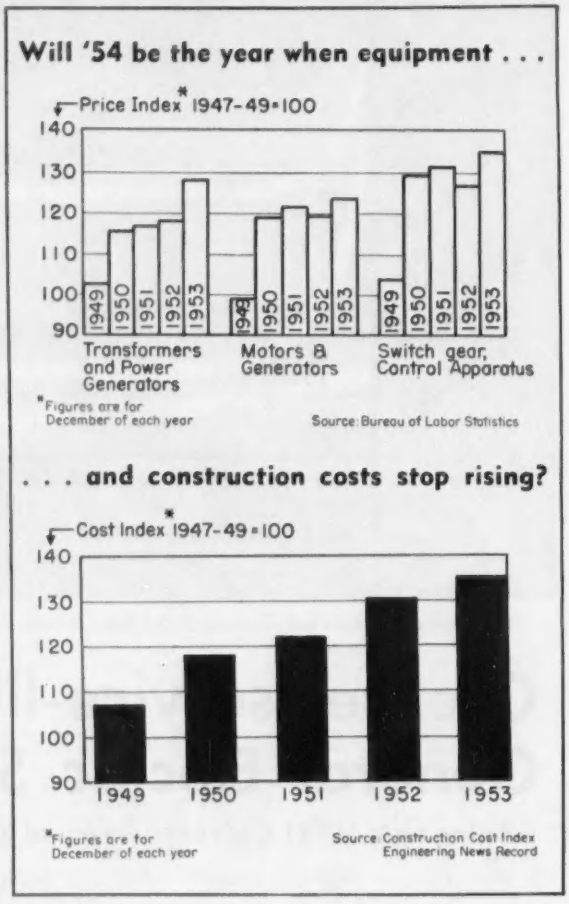
*Registered Trade-mark General Electric Company

You can put your confidence in—

GENERAL ELECTRIC

ELECTRICAL BUSINESS OUTLOOK

Expansion Costs: Due for a Leveling Off



The costs of growing have been growing themselves for electric utilities in the past few years. Costs of construction and new equipment have gone up sharply since the attack on South Korea in June, 1950. The cost of borrowed money for expansion also took a sharp hop last year. But the cost outlook for this year is brighter than it has been for several years. Right now, it looks as if all these costs will be at least stable during 1954. And there is a good chance that some of them—maybe all—will come down a little before the year ends.

The business outlook provides the chief reason for expecting stable or lower costs for new plants and equipment. Industrial projection is already down by about 8% from last summer's peak, and most observers expect a somewhat further decline in future months. If the decline continues, it's likely to create an atmosphere of greater competition for all business. And a strongly competitive situation implies stable to lower prices.

Expansion Slowing . . . Naturally, the cost of new electric plants is not going to be determined purely by an atmosphere. But a look at the prospects in the utility field bears out the general conclusion. For one thing, expansion of electric utilities is leveling off, at least for a while. The fact that demand for new electric plant and equipment is no longer growing rapidly as it has almost ever since the World War removes one source of upward pressure on prices.

Another favorable factor is the trend in production costs of companies that build new plants and equipment for electric utilities. Any savings they make on costs have a good chance of being passed on to their customers in a year when business is getting more competitive.

One key material—copper—is rated by most observers as sure to drop in price before long. Prices of other nonferrous metals, except aluminum, have already fallen. Another key material—steel—may also come down in cost. Basic steel prices may not actually drop during the year.

But there have already been some disguised price cuts in the form of lower charges for "extras" and absorption of freight charges. There will probably be more of this later on, as competition becomes keener. And the fact that steel is no longer scarce means that steel buyers won't be driven to expensive special deals that add to costs.

Hourly wage rates for workers will probably go up again this year. But total labor costs probably won't go up as fast as in recent years. One reason is that there will be less costly overtime work, now that business is operating at a less frantically high level. Another factor is cost of living, which may fall during the year. So unions with escalator wage contracts won't be getting the big raises that have marked recent years.

Inflation End In Sight . . . Taken together, these factors—more competition, stable to lower demand, lower material costs, less push on wage costs—promise an end to inflation for utilities buying new plant and equipment. Together with lower interest payments on borrowed money, they add up to fewer cost headaches this year.

On the other hand, it's highly unlikely that prices of new plant and equipment will fall by much. Chief reason is wage costs. With basic wages fixed by agreements, builders and electrical equipment manufacturers can't save much on their labor costs except by eliminating overtime and making gradual improvements in efficiency. Since labor costs are a major share of their costs of production, they won't be able to cut prices much and still stay in business for very long.

The section of Duraline has been photographed with covering unsaturated to show construction.

SERVICE DEPENDABILITY

Duraline, like a rosebud, keeps moisture out

Duraline's unique construction — an exclusive continuous interlocked fibrous sheath, thoroughly impregnated with URC saturants, then covered with URC finishers—provides finest weatherproof performance and service dependability. Won't festoon, stays right there on the job. Provides added protection against contact with foreign objects.

Duraline* is your best insurance against bad weather. Only Anaconda makes a line wire like this. Available with copper, Copperweld or aluminum conductors. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

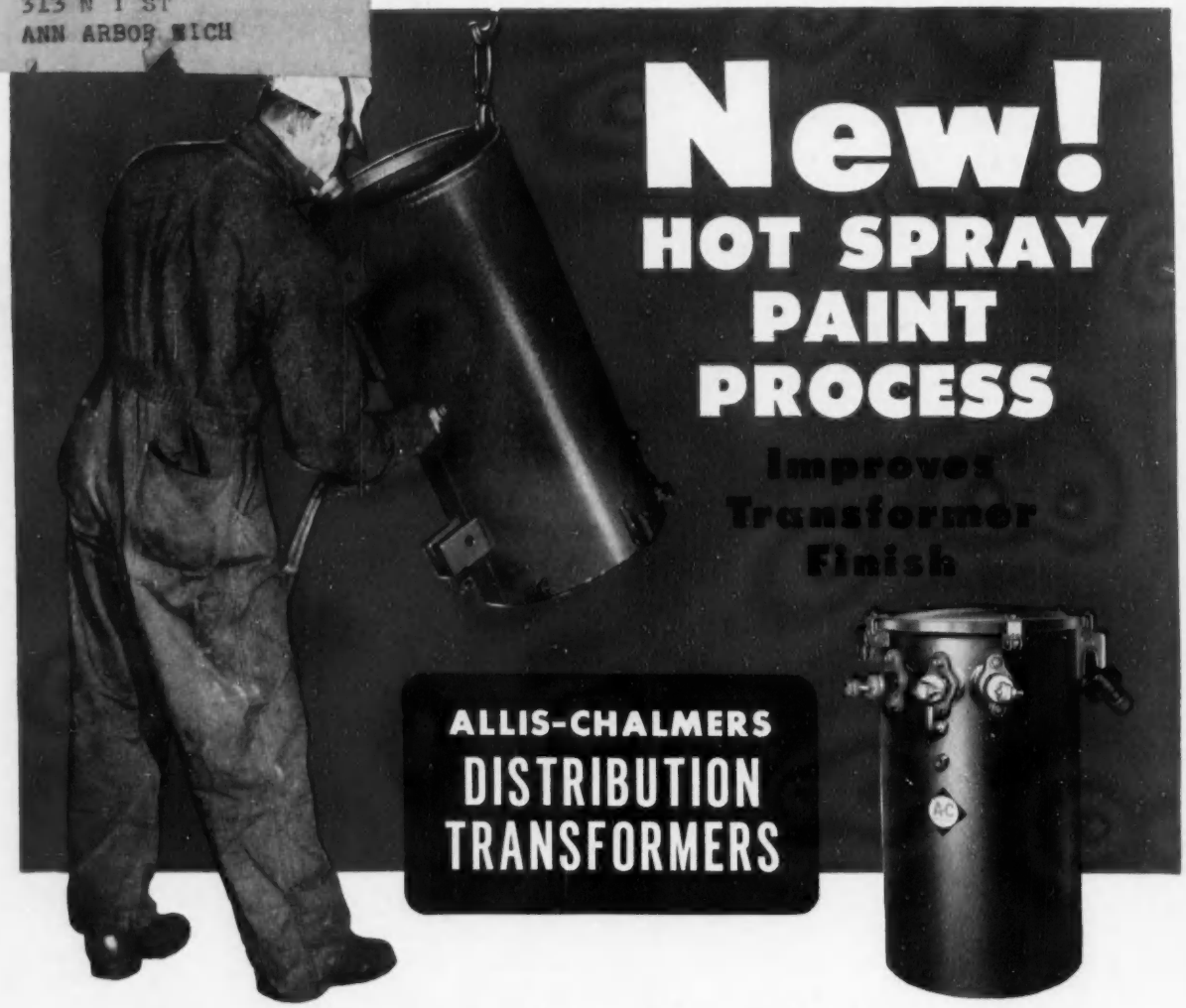
55326

*Reg. U. S. Pat. Off.

ANACONDA®

service and overhead distribution cables, both bare and weatherproof, including ACSR • signal, control and communication wire • portable cords and cables • network cables • airport and street lighting cables • mine cables • magnet wire • copper, aluminum, and copperweld conductors • wire and cable accessories.

E B POWER GS W 1
UNIVERSITY MICROFILMS 1
313 N 1 ST
ANN ARBOR MICH



A new Hot Spray System now used by Allis-Chalmers effectively substitutes heat for solvents in painting, to produce a higher quality finish than conventional spray processes. A smoother surface is achieved with a uniform coating that offers greater resistance to contamination and corrosive action. Pole type distribution transformers in ratings through 50 kva get this new surface treatment.

Paint Heated to 160 F

The fact that cold paint is thicker than paint kept at normal room temperature is widely recognized — cold paint takes more solvent to make it flow and atomize. In the new Allis-Chalmers hot spray process, alkyd-resinous paint is heated to 160 F. Only 15% solvent is required, compared to the 40% solvent needed in conventional spraying at normal temperatures. Since there is far less solvent to evaporate, shrinkage after the paint is applied is greatly reduced. And better filling properties, brought about by improved flow and atomization, result in a smoother surface with greater gloss and excellent coverage.

Tests Prove Value

Tests conducted at Allis-Chalmers and at the Sub-Tropical Testing Laboratories at Miami, Florida show conclusively that tanks first cleansed and treated by Spra-Bonderizing and then Hot Spray painted have a superior protective surface. Test conditions included salt spray, humidity and sunlight as well as industrial atmosphere.

For more information on Allis-Chalmers new hot spray system as applied to distribution transformers, contact your nearby A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4201

ALLIS-CHALMERS